# CONSUMER EXPERIENCE WITH THE QUALITY OF PRIMARY CARE: A COMPARISON BETWEEN COMMUNITY AND HOSPITAL SETTINGS IN TAIWAN

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# ABSTRACT

**Background and motivation:** The purpose of this study was to assess the quality of primary care rendered at the community setting relative to the hospital setting. Three aims were analyzed: Aim 1: To examine the factors associated with consumers' selection of primary care services provided in either community or hospital settings; Aim 2: To compare the quality of primary care provided in community and hospital settings; and Aim 3: To understand consumers' perspectives on the family-physician model of primary care.

**Materials and methods:** The study population was comprised of Taiwan residents. Based on power analysis, we contacted 1,068 subjects (8.08% of the number of phones called or 15% of those reached), all of whom were between 20 and 70 years of age and insured under the NHI program (National Health Insurance) in Taiwan. The subjects were contacted by telephone and invited to participate in the study. Those who agreed were interviewed regarding the quality of primary care using the Johns Hopkins' Primary Care Assessment Tool. The Survey Research Institute of Hungkuang University was contracted to provide this professional service. An interview questionnaire was developed covering the following topics: consumer demographics, hospital-based primary care profile, community-based primary care profile, primary care quality (PCAT), and healthcare outcome.

**Results and discussion:** More people in Taiwan chose community-based primary care over hospital-based primary care. However, community-based primary care system in Taiwan is far from fulfilling the roles of a high-quality primary care system, and thus needs further efforts from policy makers, providers, and researchers. While no disparity

in quality was found between CBPC and HBPC, significant differences within primary care domains were identified. No significant differences in overall patient satisfaction were found between CBPC and HBPC. After controlling for individual socioeconomic characteristics, cultural competence appeared to be the most influential factor on patient satisfaction for both groups.

**Conclusions:** More people in Taiwan chose community-based primary care over hospital-based primary care. However, community-based primary care system in Taiwan is far from fulfilling the roles of a high-quality primary care system, and thus needs further efforts from policy makers, providers, and researchers.

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# Chapter 1. Introduction

Taiwan established a universal health insurance system known as the National Health Insurance (NHI) program in 1995. The program is government-run and a single-payer compulsory social insurance plan that has centralized disbursement of healthcare funding (Chiang 1997). The NHI promises equal access to healthcare for all citizens, and as of 2011, 99.9% of citizens were covered by this program. In 2002, NHI changed from a fee-for-service to a global budget (prospective payment) system. According to the April 2010 report from the Department of Health, health expenditures in Taiwan were 5.8% of the current GDP with 64.9% of the program's expenditures paid for with public funds. Taiwan has about 1.6 physicians and 5.9 hospital beds per each 1,000 residents. As of 2011, there were 368 hospitals and 2,601 clinics in Taiwan which have led to an overall life expectancy of 79.2 years, according to data from the Taiwan Bureau of Statistics (2012).

Preventive medical services, prescription drugs, dental service, traditional Chinese medicine, and home nurse visits are provided by the NHI. Most of these preventive services are provided free of charge. Regular office visits have a system of co-payments that range from USD$5 –USD$80, which depends on the patient's choice of community-based or hospital-based setting. In the system developed in Taiwan, citizens are free to choose the hospital or physician they desire through their willingness to make the required co-payments. The Taiwanese healthcare system has four levels of hospitals. They are 1. medical centers; 2. regional hospitals; 3. local hospitals; and 4. clinics. Larger, more popular hospitals have higher copayments and are often over-crowded.

General practitioners (GP) are often less expensive than hospital-based services. Each level requires adherence to and accreditation by the Taiwan Joint Commission Hospital Accreditation (TJCHA) every 4 years. In turn, the accreditation agency determines the appropriate co-payment to the medical facilities in question as well as what is covered by the co-payment.

The Taiwanese people hold NHI in high-esteem as evidenced by a high approval rate. Taiwanese citizens can visit any doctor or medical facility without referral. Patients feel comfortable choosing to see their doctor for minor illnesses, preventive care, health checkups, consultations, or poly-pharmacy because they have a good relationship with and trust their family doctor. NHI covers most services provided by a health system, such as dental care, parturition, western medicine, traditional Chinese medicine (TCM), preventive services, and elderly home care. A simple description of NHI is cheap and abundant care.

## 1.1 Current Problems with Healthcare in Taiwan

The NHI program enrolled approximately 99% of the population of Taiwan in 2011, as indicated by provider contract rates of 92.9% for hospitals/clinics and 54.6% for pharmacies. However, the budget for the health systems is often overwhelmed by increasing costs. Accordingly, the NHI budget has been separated into four independent categories: 1. hospital care; 2. community-based care (including primary and special care); 3. dental care; and 4. traditional Chinese medicine. Each category offers reimbursement for services using a fee-for-service scheme. The stressors of the budget include competition among hospitals and medical facilities for patients as well as

continuous overuse by patients. This payment scheme has lead to a decrease in the number of small hospitals and medical facilities such as clinics.

There are no gatekeepers to prevent overuse and abuse of access to primary care. This lack of oversight plays a critical role in patient overuse and abuse. In Taiwan, patients can freely choose a healthcare provider, but this lack of a gatekeeper has meant that there are no checks and balances as to whether specialty healthcare is being used appropriately. Often, larger medical institutions are operating at full capacity with many patients finding admittance difficult, while simultaneously, medium-sized hospitals have all but disappeared. An unfamiliar public does not know of or use the services of a family physician program properly. The insured public has freedom to choose their healthcare provider and they often choose well-equipped, larger hospitals because of perceived higher quality and relatively cheap access. This freedom of choice places more strain on budgets and negatively influences the competition among healthcare providers.

Patients overusing and abusing the system have no restraints that prevent them from this activity, which leaves hospitals and physicians without any recourse or stop-gap to prevent overuse, abuse, and, thus, overspending. An unequal payment scheme has contributed to a serious personnel shortage of specialist doctors such as surgeons and trauma specialists. The reason for this is a decrease in available compensation for these specialties which has caused doctors to enter more lucrative specializations and become more reluctant to enter these and other high-risk specialties. This further resulted in physicians who are more attracted to lower-risk specialties such as dermatology, plastic surgery, and cosmetic medicine, which further depletes the number of physicians in overburdened specialties.

Moreover, the high level of health-seeking behavior is common in Taiwan. The culture of Taiwan is supportive for the frequent use of medicines, doctor visits, and concern for health even for minor ailments. The average outpatient visit rate is about 14 times per person per year. This is significantly higher than outpatient visit rates in the UK or the US. It is not uncommon for doctors in Taiwan to see 50 or more patients in a single morning. As such, each patient receives less than five-minutes of face time with their doctor during their visit. The short face time patients get with their doctor results in poor patient-physician relationships and indicate a larger problem of not being able to deal with complex problems in a single visit. Consequently, patients will often seek more opinions from equally busy doctors, further contributing to a higher patient volume and increases in costs.

## 1.2 Research Motivation

Reforming NHI and the healthcare system in Taiwan is necessary to realign healthcare-seeking patterns and to reduce costs with quality improvements. Specifically, we suggest moving from hospital- to community-based primary care as a viable strategy to realign the healthcare system of Taiwan. However, patients will expect care in community-based settings to be of the same quality of services that they are used to in medium to large hospitals. If quality in community-based settings is seen as inadequate, then efforts will need to be directed towards improving quality. First, we focus on an assessment of quality for primary care in a community setting relative to a hospital setting. We propose three study aims that facilitate the understanding of the current quality of primary care services provided by community-based or hospital-based primary care in Taiwan in relation to patient selection and preferences.

The specifics of these aims are listed as follows:

Aim 1: To examine the factors associated with patient selection of primary care services provided by either a community-based medical facility or hospital.

Aim 2: To compare the quality of primary care provided in community medical facilities versus hospitals.

Aim 3: To understand patient perspectives on the family-physician model of primary care.

We will describe patient profiles that are either seeking community- or hospital-based primary care. The relative quality of primary care services provided in these two settings and the general public acceptance of the family physician model will be a part of this profile as well. Our answers to these questions will help policymakers to develop appropriate strategies that will further advance the delivery of primary care in Taiwan.

# Chapter 2. Literature Review

We begin by describing our literature search methodology followed by defining primary care. Then, literature is reviewed that demonstrates the importance of effective primary care services to deliver quality healthcare, improve health outcome, and reduce health and healthcare disparities. We also conduct a review of Taiwan-based primary care, and the various definitions and methods used to assess quality prior to summarizing the Johns Hopkins Primary Care Assessment Tool.

## 2.1 Literature Search Methods

All literature searches were performed using PubMed with the following search terms: ‘quality,’ ‘indicators,’ ‘performance,’ ‘primary care,’ ‘assessment,’ ‘evaluation,’ ‘general practice,’ ‘family medicine,’ ‘health outcome,’ and ‘health equity.’ The search was limited to English language medical journals. The titles and abstracts of all papers identified by the electronic search were inspected. We discarded all papers that did not satisfy our inclusion criteria. The resultant references are related to primary care quality and quality assessment. Resultant empirical studies were required to have a sample size larger than 300. Additional important articles were subsequently located from an examination of bibliographies from retrieved articles.

## 2.2 Defining Primary Care

Primary care is a requirement for building a strong healthcare system to ensure positive health outcomes and health equity as well as being central to healthcare delivery. Over the last century, a transition to public health from disease-oriented etiologies has had

interactive influences for multiple factors rooted in culture, race/ethnicity, policy, and environment. This transition calls for individual- and family-focused community-oriented primary care services that are to be delivered in a continuous and coordinated manner that meets the healthcare needs of Taiwan. In 2001, the World Health Organization (WHO) proposed a global goal to achieve primary care for individuals in all six domains established in the Institute of Medicine (IOM) Alma-Ata Declaration (1978). These six domains are first contact, longitudinality, comprehensiveness, coordination, person/family-centered, and community orientation. These six domains were agreed upon internationally and have proven effective to identify the breadth of primary care services in monitoring primary care quality since implementation (World Health Organization 2008; Starfield 1998; Forrest and Starfield 1998; Franks and Fiscella 1998).

Primary care is distinguished from secondary care and tertiary care by duration, frequency, and intensity level. Secondary care is typically short-term and involves sporadic consultation from specialists that offer expert opinions, surgical advice, and/or other advanced medical interventions. Tertiary care is the most complex level of care and is required for uncommon and unique conditions. Further, tertiary care is also institution-based, highly specialized, and technology-driven. Examples include trauma care, burn treatment, neonatal intensive care, tissue transplants, and open heart surgery, among others.

The World Health Organization (WHO) has described primary healthcare as:

> "Essential healthcare based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to individuals and families in the community by means acceptable to them and at a cost that the

> community and the country can afford to maintain at every stage of their development in a spirit of self-reliance and self-determination. It forms an integral part of both the country's health system of which it is the central function and the main focus of the overall social and economic development of the community. It is the first level of contact of individuals, the family, and the community with the national health system, bringing healthcare as close as possible to where people live and work that constitutes the first element of a continuing healthcare process (WHO 1978)."

Primary care is defined as health services that have been rendered by providers who are acting as principal consultants for patients within the healthcare system (Thomas-MacLean et al. 2011; World Health Organization 2011). These providers could be primary care physicians, (i.e. general practitioners or family physicians), or depending on the locality, health system organization, and patient discretion, primary care providers may also be pharmacists, physician assistants, nurse practitioners, nurses (a common practice in the UK), a clinical officer (a common practice in parts of Africa), or traditional medicine professional (a somewhat common practice in parts of Asia). Traditionally, primary care has been crucial for ambulatory care services. Patients may or may not be referred for secondary or tertiary care depending on the nature of the health condition.

Since it was introduced in 1961, primary care has been defined in many ways, typically using one or more of the following categories of classification (Alpert and Charney 1973; Fry 1980; Lee, 1992; Abramson and Kark 1983; Starfield, 1998). These categories include:

- The care provided by specific clinicians, for example, the Clinton administration Health Security Act specified primary healthcare as family medicine, general internal medicine, general pediatrics, and obstetrics/ gynecology. Some experts and groups also include nurse practitioners and physician assistants;
- A set of activities that function as boundaries for primary care, for example, curing or alleviating common illnesses and disabilities;
- A level of care or setting with an entry point into the system that includes secondary care (as delivered by community hospitals) and tertiary care (by medical facilities and teaching hospitals);
- A set of attributes, as in the 1978 IOM definition, including care that is accessible, comprehensive, coordinated, continuous, and accountable or, as defined by Starfield (1998), care that is characterized by first contact, accessibility, longitudinality, and comprehensiveness;
- A strategy to organize the healthcare system as a whole, such as community-oriented primary care that prioritizes resources and community-based healthcare while decreasing the emphasis on hospital-based, technology-intensive, and acute-care medicine.

The Millis Commission report and the IOM (1978) have defined four elements for primary care. These are: (1) first-contact care and gatekeepers; (2) longitudinality and managed care; (3) comprehensiveness and benefit packages; and (4) coordination and the referral process. Starfield (1998) used these elements to identify important aspects of primary care and conduct cross-national comparisons of primary care from 10 countries. Healthcare systems have implemented these four elements to varying degrees. The

analysis of primary care in the United States has revealed a healthcare system that is based largely on unregulated and fee-for-service practices, and is rated the lowest of the 10 countries analyzed (Starfield, 1998).

Also included are definitions of primary care based on criteria developed by the IOM (1978) and further elaborated in the IOM report on community-oriented primary care (1984) (see IOM, 1978, 1984). The 1984 committee had decided early on that the IOM definition (1978) was a good starting point. However, the committee desired to better formulate and define a newer version that recognized two important trends 1. the greater complexity of healthcare delivery and 2. the growing and greater interdependence of health professionals. In particular, these trends are seen in the rapid growth of integrated delivery systems with enrolled populations and the use of teams to deliver primary care services. Also, attention has been increasingly focused on several issues in healthcare that were not included in the 1978 definition, such as, (a) clearer relationships among primary care, community, and public health needs; (b) the needs and roles of families; (c) a focus on the measurement and improvement of health outcomes; (d) patient satisfaction and individual participation in healthcare decision-making; and (e) the scientific basis for primary care.

The following summarizes the importance of primary care (Starfield 1998):

- Primary care is a logical foundation for an effective healthcare system because primary care addresses the majority of patient health problems.
- Primary care is crucial for achieving the "value" objectives for healthcare, quality of care including achievement of desired health outcomes, patient satisfaction, and the efficient use of resources.

- Individual interactions based on trust and partnership between patients and clinicians that remain central for primary care.
- Primary care is a critical tool for achieving better emphasis on (a) health promotion and disease prevention, and (b) chronically ill care, especially among the elderly.
- The trend toward integrated healthcare delivery systems provides opportunities and challenges for primary care.

## 2.3 Characteristics of Primary Care

Three elements from the WHO definition of primary care are particularly noteworthy to understand primary care: point of entry, coordination of care, and essential care.

### 2.3.1 Point of entry

Primary care is the point of entry (i.e. first contact) for patients into the health care system. Healthcare delivery is organized around primary care (Starfield 1998). First contact is closely associated with the gatekeeper role for the primary care practitioner (PCP). Gate-keeping implies that patients do not visit specialists and do not need to be admitted to a hospital without being referred by a PCP.

Primary care should be located near a patient's home and workplace. True primary care is community-based in that it represents convenience and is easily accessible. These services must be widely available to urban, suburban, and rural communities for basic, routine, and inexpensive primary care services. Appropriate technology must also be incorporated into the delivery of primary care to avoid costly referrals to secondary and tertiary healthcare.

### 2.3.2 Coordination of care

A function of primary care is the coordination to deliver health care services between patients and a myriad of delivery components within the healthcare system. In addition to providing basic services, primary care professionals must serve as advisors, advocates, and system gatekeepers for patients. As coordinators, providers will refer patients to specialized sources for care, offer advice for various diagnoses and therapies, discuss treatment options, and provide continuing care for chronic conditions. Coordination of patient healthcare needs will ensure continuity and comprehensive coverage. The goals of primary care can be achieved when patients and providers have formed a close mutually beneficial relationship in time.

The ideal system for healthcare delivery is based in primary care but is also closely interlinked to adequate and specialized services. Continuous and coordinated care requires certain secondary and tertiary services to be integrated with primary care with appropriate interaction and consultation among physicians.

### 2.3.3 Essential care

Primary healthcare is essential healthcare. The goal of the healthcare delivery system is the optimization of population health, not just for those patients who have means to access health services, but for the entire population. Achieving this goal requires that disparities across population subgroups be minimized to ensure equal access. Universal access to primary care services is better achieved under a national healthcare program because the financing of healthcare is a crucial element that determines access to healthcare services. The lack of universal access to primary care services for countless millions is a pressing concern in the United States.

In Starfield's landmark book, *Primary care: Balancing health needs, services and technology*, primary care is defined as provisions to integrate and access healthcare services from clinicians that address large personal healthcare needs, develop a long-term partnership with patients, and practice within the context of family and community (Starfield 1998). The book further summarizes primary care characteristics:

- The intention of integrated care is to encompass the provisioning of comprehensive, coordinated, and continuous services for seamless process of care. Integration combines events and information about events occurring in disparate settings and levels of care over time.
- Comprehensive care addresses any health problem at any given stage of patient life cycles.
- Provision of a combination of health services and information to ensure coordinated care and meet patient needs including the connection between services and including community resources.
- Continuous care refers to care over time by a single individual or team of healthcare professionals (known as clinician continuity) as well as effective and timely communication for health information, such as events, risks, advice, and patient preferences (record continuity).
- Accessible care is the ease at which a patient initiates interaction for a health problem with a clinician (e.g., by phone or at a medical facility), including efforts to eliminate barriers such as geography, administrative hurdles, financing, culture, and language among others.

- Healthcare services are an array of services performed by healthcare professionals to promote, maintain, or restore patient health. It includes all settings for care, such as hospitals, nursing homes, physician offices, intermediate care facilities, schools, and homes.
- Clinicians are individuals with recognized scientific knowledge base, background, and authority to direct the delivery of health services to patients.
- Accountability applies to primary care clinicians and the systems they operate. These clinicians and systems are responsible to patients and communities to address the majority of personal health needs within a sustained partnership with the patient and for (1) quality of care, (2) patient satisfaction, (3) efficient use of resources, and (4) ethical behavior.
- The majority of healthcare needs refer to essential primary care services that patients typically need to maintain health. Individual healthcare needs include physical, mental, emotional, and social problems that affect the normal functions of individual patients.
- The sustained partnership refers to the relationship between patients and clinicians with mutual expectations over time. This relationship is based on developing mutual trust, respect, and responsibility.
- A patient is defined as an individual who interacts with clinicians because of real or perceived illnesses, for health promotion, or prevention.
- The context of family and community is an understanding of patient living conditions, family dynamics, and cultural background. Community is defined as the population served by the clinician. Additionally, community refers to geopolitical

boundaries (city, county, state, or region), members of specific health plans, or neighbors who share values, experiences, language, religion, culture, or ethnicity.

## 2.4 The Efficacy of Primary Care

The 2008 WHO Annual Report, *Primary Care – Now more than ever*, stated "There is a substantial body of evidence on the comparative advantages, in terms of effectiveness and efficiency, of healthcare organized as people centered primary care". (WHO, 2008)

Primary care is defined as first-contact care, that is longitudinal, comprehensive and coordinated (Starfield 1992). Thereby, primary care provides patients with ongoing access to a primary provider who is able to provide both acute and preventive care, along with appropriate referral and coordination with other services. Furthermore, Starfield et al. (2005) identified six features associated with primary care that contribute to a population health. These six features are 1.) Improved access to services; 2.) Improved quality of care; 3.) Greater emphasis on prevention; 4.) Early management of health problems; 5.) Combined effect of primary care delivery characteristics; and 6.) Primary care to reduce unnecessary and potentially harmful specialist care.

There is strong theoretical and empirical evidence for an association between primary care services and improved health outcomes (Shi et al. 2003, 2004). The significant benefits of preventing newly emerging communicable diseases and reducing deaths from noncommunicable diseases (NCD) via health education, early detection, and intervention are indicated throughout research (Roetzheim et al. 1999 and 2000; Ferrante et al. 2000). These are robust and consistent associations that are held regardless of the level of analysis. Furthermore, primary health care is instrumental in the reduction of inequities in health care and provides long-term benefits through cost-savings. These

benefits are likely to be further extended through health reforms impacting access to primary care and through ongoing improvements in quality assessment.

### 2.4.1 Evidence from industrialized nations

Much of the research on the effectiveness of primary care has been conducted in high-income countries. Through international comparative studies, countries with a higher rank for primary care presented better health outcomes. Countries with a poorer ranking in primary care experience had increased healthcare costs and poorer outcomes (Starfield 1991, 1994; Starfield and Shi 2002; Macinko et al. 2003). Other research has demonstrated that primary care contributes to improved public health and health outcomes, the prevention of illness and death, and decreased use of medical care, which in turn is associated with decreased costs (Engstrom et al., 2001; Starfield et al., 2005; Shi et al. 2005; Friedberg et al., 2010). Countries with health systems that were oriented toward primary care achieved better health levels, higher satisfaction with health services among the population, and decreased expenditures for overall healthcare delivery (Starfield 1994, 1998). Countries with weak primary care infrastructures incur poorer health outcomes and increased healthcare costs. Even in the United States, better health outcomes were achieved in states with higher ratios of PCPs and better availability of primary care (Shi 1994; Shi and Starfield 2000, 2001; Shi et al. 2002).

A higher ratio of family and general physicians to residents was also associated with lower hospitalization rates for treatable conditions with quality primary care (Parchman and Culler 1994). A regular source of primary care has lead to fewer ED visits and inappropriate specialty consultations and provided settings that managed chronic conditions better so that individuals stayed healthier longer (Sepulveda et al. 2008).

Studies have shown the appropriateness and outcomes of healthcare interventions were better when patients were referred to specialists by PCPs, as opposed to patients not needing referrals (Bakwin 1945; Roos 1979). One quasi-experimental Cuban study found that primary healthcare reforms reduced adult and child mortality rates significantly (Rosero-Bixby, 2004 cited Mackinko et al., 2009).

In the United States, primary care and health service use was studied by using interactional analysis instruments to characterize patient-centered care in a primary care setting and examine its relationship with healthcare utilization (Bertakis and Azari 2011). A total of 509 adult patients at a university medical center were randomized into groups receiving care by family physicians or general internists. An adaptation of the Davis Observation Code was used to measure patient-centered practices. The primary outcomes measured were patient use of medical services and accrued charges over one-year. The results indicated that higher amounts of patient-centered care were related to a significantly decreased annual number of visits to specialty providers, less frequent hospitalizations, and fewer laboratory and diagnostic tests. The total medical charges for the year were significantly reduced.

Another US study examined the relationship between physician connectedness and measured physician performance (Atlas et al. 2009). A total of 155,590 patients who made one or more visits to a study practice from 2003 to 2005 at Massachusetts General Hospital adult primary care network were identified. A validated algorithm was used to connect patients to physicians or practices. Performance measures, including breast, cervical, and colorectal cancer screening in eligible patients, hemoglobin A1C measurements, controls in patients with diabetes, low-density lipoprotein cholesterol

measurement, control in patients with diabetes, and coronary artery disease were all used to examine clinical performance. The results were significant and indicated that physician-connected patients were more likely than practice-connected patients to receive guideline-consistent care. Variations in preventive care were more likely due to connection to a clinician than race or ethnicity.

The role of primary care for referrals was studied as part of a multi-country project in Europe and Australia (Jebb et al. 2011). The study compared weight loss achieved through standard treatment in primary care versus weight loss achieved post- primary care team referral to a commercial provider in the community. In a parallel group, non-blinded, randomized controlled trial, 772 overweight and obese adults were recruited by primary care practices in Australia, Germany, and the UK to receive 12 months of standard care, as defined by national treatment guidelines, or 12 months of free membership in a commercial program. The results were analyzed by intention to treat the population that completed the 12-month assessment. The results showed that participants referred to community-based commercial providers lost more than twice as much weight over the 12-month period when compared to participants that received standard care. These results further indicate that referrals to commercial weight loss programs that provide regular weighing, diet advice, physical activities, motivation, and group supports offer clinically useful early intervention for weight management in overweight and obese people and delivers in a large-scale cohort as well.

A Canadian study on the impact of primary care outreach (Ploeg et al. 2011) used a randomized, controlled trial design to evaluate the influence of a provider-initiated primary care outreach intervention compared with typical care among older adults at risk

for functional decline. The sample was comprised of 719 patients enrolled with 35 family physicians in five primary care networks in Hamilton, Ontario (Canada). The 12-month intervention provided by experienced home care nurses from 2004 to 2006 consisted of a comprehensive initial assessment using the Resident Assessment Instrument for home care; collaborative care planning with patients, families, and family physicians; health promotion activities; and referrals to community health and social support services. The primary outcome measures were quality adjusted life years (QALYs), use, costs of health and social services, functional status, self-rated health, and mortality. The results for the mean difference in QALYs, overall costs for prescription drugs and services, and changes over 12-months in functional status and self-rated health were not statistically significant. The results of this study do not support the adoption of preventive primary care intervention for the target population of high-risk older adults.

Another study conducted in Pittsburgh, Pennsylvania USA examined the role of nurses in primary care (Kolko et al. 2010). This study evaluated findings from a trial treatment targeting behavioral problems in 163 clinically referred children from six primary care offices in Pittsburgh. Participants were randomly selected to have either a protocol for on-site nurse-administered intervention (PONI) in primary care or enhanced usual care (EUC) characterized by on-site diagnostic assessment and facilitated referrals to local mental health providers. The primary outcomes were measured by standardized rating scales. The results have shown that children with PONI were significantly more likely to access assigned treatment, receive more direct treatment, adjunctive services, and a longer duration of treatment and sibling participation in the intervention than children assigned to receive EUC. These findings have indicated that psychosocial

intervention for behavioral problems delivered by nurses in primary care settings is feasible, improves access to mental health services, and has clinical efficacy. An option to enhance clinical outcomes include the use of multifaceted collaborative care interventions in pediatric practices.

The impact of primary care on chronic disease management has been the subject of much research. A study in the United States examined the impact of a multifaceted intervention on cholesterol management in primary care practices (Bertoni et al. 2009). The study designed a practice-based trial to test the hypothesis that a multifaceted intervention that consisted of guidelines dissemination enhanced by computerized decision support systems (CDSS) improved primary care physician adherence to the *Third Adult Treatment Panel* (ATP III) guidelines and the management of cholesterol levels. A total of 61 primary care family and internal medicine practices in North Carolina enrolled in the trial with 29 having received ATP III intervention and 32 having received an alternate intervention JNC-7. ATP III intervention providers received a personal digital assistant that provided Framingham risk scores and ATP III–recommended treatment. They examined 5,057 baseline and 3,821 follow-up medical records. The study reported that the positive effect on the screening of lipid levels and appropriate management of lipid level test results revealed that multifactor interventions including personal digital assistant-based decision support improved primary care physician adherence to the ATP III guidelines.

In the United Kingdom, the Quality and Outcomes Framework (QOF), a pay for performance initiative aimed at improving the quality of primary care, was developed in 2004 to reward general practices that achieve satisfactory levels on certain quality

indicators, with 60% of these indicators being related to clinical care (Health & Social Care Information Centre , 2013). While the QOF increases the quality of healthcare delivered, it is important to determine whether quality primary care is associated with improved health outcomes. A cross-sectional analysis conducted by Kiran et al. (2010) examined 1531 general practices in London and found that the practices with higher coronary heart disease (CHD) quality achievement scores also had better CHD outcomes. Each point of increase in CHD quality achievement score was associated with 4.28 fewer hospital admissions per 100,000 patients (Kiran, 2010). A similar relationship was observed between the quality achievement level and the number of deaths due to CHD. This study demonstrates the positive effect that quality primary care has on CHD health outcomes, and serves as a model for using an incentive program to promote high quality care provision.

A study conducted in the United Kingdom builds on the results of the previous study by exploring the aspects of quality primary care that are responsible for producing positive health outcomes. A cross-sectional study of 229 general practices found that achieving stringent control of serum cholesterol levels and the patient being able to recall access to the primary care physician were associated with lower rates of premature death from CHD and all-age mortality (Honeyford, 2013). This study also examined the differences in mortality rates across regions based on the level of relative deprivation of primary care access. The researchers found that there was a 20% lower rate of premature CHD mortality in areas that had a higher concentration of primary care physicians (Honeyford, 2013). The findings of this study demonstrate the important role primary care plays in diagnosing CHD early and how optimizing treatment improves chances of

positive outcomes. The patients who regularly saw their primary care physician were able to maintain better control of their cholesterol levels and experienced better outcomes overall, attesting to the efficacy of primary care in producing better outcomes in CHD patients.

A study in the United Kingdom for chronic depression in primary care used a randomized, controlled trial design that evaluated if regular structured-practice nursing care led to better mental health and social outcomes for patients and assessed the cost-effectiveness of structured reviews compared to typical care received (Buszewicz et al., 2010). A total of 588 participants with a history of recurrent or chronic depression were recruited from 42 general practices throughout the United Kingdom with 282 placed in the intervention group and 276 in the control group. The comparison was between 'GP usual care' (control group), and a 'structured care' approaches that involved regular follow-up by nurses (intervention group) in addition to GP typical care. The primary outcomes included participant mood, in addition to pharmacological and psychological treatments as well as any relevant social factors. These variables were measured at baseline and post-intervention over the two-year study period.

A study from the United States focused on diabetes management used a randomized, controlled trial that examined the relationships among patient characteristics, labor inputs, and improvement in glycosylated hemoglobin (A1C) level in a primary care-based diabetes disease management program (DDMP) (White et al., 2010). A total of 217 patients with type 2 diabetes mellitus and poor glucose control were enrolled. The results have shown that patients in the intervention group had significantly greater improvements in A1C level than the control group did. From the multivariate analysis, there were no

significant differences in A1C level improvements that were observed when stratified by age, race/ethnicity, income, or insurance status. No interaction effect was observed between any covariate and intervention status. Labor inputs among those enrolled were similar regardless of age, race/ethnicity, sex, or education and reflected the nondiscriminatory nature of the algorithm based disease management care.

The role of primary care in preventive care has also been studied. Preventive services provided through primary care, such as provision of educational materials and behavioral counseling, for increasing health literacy have been shown to be more effective for smoking cessation than if the same services were provided in the community setting (Taggart et al. 2012). In a meta-analysis conducted on 52 interventional studies, compared to primary health care settings, of which 50% were successful at demonstrating change in smoking, only 20% of community settings demonstrated change. Based on these findings it is proposed that primary care, given its clinical setting and access to pharmacotherapy services, may provide an opportunity to provide effective preventive services.

The impact of preventive services provided through primary care has also been found for outcomes requiring a behavioral response. A study from Spain on physical activity promotion by general practitioners reported the effectiveness for physical activity promotion programs at 11 Spanish public primary care centers with 6-, 12-, and 24-month follow-up measurements (Grandes et al., 2011). They recruited 4,317 individuals (2,248 interventions and 2,069 controls) and assessed the physical activity level for a systematic sample of patients in routine practice. A total of 56 general practitioners were randomly assigned into either the intervention or standard care groups. The primary outcome

measured was the change in self-reported physical activity from the baseline. The results indicated that general practitioners were effective at increasing the level of physical activity among inactive patients during the initial 6-months of intervention but this effect leveled off at the 12- and 24-month points of the intervention. Only the subgroup of patients that received repeat prescriptions of physical activity maintained long-term gains.

These findings have been further supported across other studies. A 2012 systematic review and meta-analysis that sought to explore whether physical activity promotion based in primary care resulted in sustained fitness examined 16 randomized-controlled studies conducted on adults, with a minimum follow-up period of 12 months (Orrow 2012). Of those included, eleven individual studies returned positive effects on self-reported physical activity at 12 months. Furthermore, a pooled analysis of 13 of the studies found small to medium effects on self-reported physical activity. These findings show support for the provision of preventive services in the primary care setting, but identifies several areas in which research can further elucidate this relationship through examination of objective measurements of physiological effects, such as cardiorespiratory fitness.

### 2.4.2 Evidence from low- and middle-income countries

An overview of low- and middle-income countries found that 14 countries, including China, with comprehensive primary care (defined as >80% skilled birth attendance rates) experienced increased health when compared with countries that had more selective primary healthcare approaches. The health improvements were deemed to "depend on progression to comprehensive primary care with a reliable referral system linking to

functioning facilities" (Rohde et al., 2008). However, this study looked at countries as a whole and did not account for within-country variations. Additionally, the study did not consider a definition of comprehensive primary care based on primary care characteristics other than skilled birth attendance rates.

As low- and middle-income countries move toward increasing access to primary care, many are experiencing reductions in hospitalizations and lower health vulnerability. In Brazil, structural changes to the health system have increased access to primary health care through the Family Health Strategy (FHS). The FHS provided for a multi-professional team to supply primary care services and oral health in both urban and rural areas. Within the municipality of Belo Horizonte, the replacement of its preexisting health system with FHS teams resulted in primary care coverage for 70% of its population. In an examination of primary care hospitalizations over the course of four years in Brazil, rates reduced as access to a primary care services through the FHS increased (Mendonca 2011). This improvement occurred to a greater extent within areas that had previously suffered from the highest rates of health vulnerability. The reduction in hospitalizations was particularly found among vaccine preventable diseases and for acute complications of chronic diseases.

In a study conducted in Bogota, Columbia, the impact of the Primary Health Care (PHC) strategy implemented by the district government on health outcomes was examined (Mosquera 2012). Prior to the implementation of the PHC strategy, primary health care was limited in Columbia and was segmented through a 1993 law providing insurance companies the responsibility of providing health services and local governments the responsibility of providing public health programs. The PHC strategy

sought to reintegrate services and improve care for vulnerable populations. Infant mortality rate, under-5 mortality rate, infant mortality from acute diarrheal disease (ADD) and pneumonia, prevalence of acute malnutrition among children under 5, vaccination coverage for diphtheria, pertussis, and tetanus (DPT) in children under 1 year, and prevalence of breastfeeding among infants under 6 months, were examined. In localities with high PHC coverage, there existed a lower risk of under-5 mortality, infant mortality by pneumonia, acute malnutrition, and a higher probability of being vaccinated for DPT.

The effectiveness of chronic condition management provided in the primary care setting has also been found in low- and middle-income countries. In an analysis of 11,686 rural residents of Iran, the density of primary care workers has been found to result in improved diabetes management (Farzadfar et al. 2012). Iran, a middle-income country (The World Bank 2013), has recently implemented the National Diabetes Control and Prevention Programme, which aimed to integrate diabetes care into primary care services (Azizi 2003). The implementation of this program and resulting primary care focus on diabetes management is considered to be a driving force of the observed improvements (Farzadfar et al. 2012).

While some low- and middle-income countries have been successful in utilizing primary care to improve provision of preventive services and chronic care management, many others have yet to experience this effect. In a randomized-controlled trial of 269 adults in Syria, nicotine replacement therapy in addition to behavioral counseling provided in the primary care setting was not found to result in a significant improvement of smoking cessation (Ward et al. 2013). These findings are directly in opposition to

previously discussed research within industrialized countries that found that behavioral counseling within a primary care setting is effective in smoking cessation, due to its ability to provide pharmacological interventions (Taggart et al. 2012). It is believed that barriers exist in low- and middle- income countries that may prevent full realization of the benefits of primary care, such as access to primary care providers and ability to pay for medications and services prescribed by primary care providers (Lando 2013; Liu et al. 2012).

### 2.4.3 Primary care and health equity

Primary care has also been associated with a more equitable distribution of health within a population (Starfield et al, 2013, Starfield et al., 2005; Shi et al., 2005). The first annual National Healthcare Disparities Report in the US (2003) stated that primary care eliminates disparities "related to preventive services and management of common chronic diseases typically delivered in primary care settings" (Siegel et al. 2004). A disproportionate share of ambulatory care for disadvantaged populations was delivered by primary care providers. Improved access to primary care has been associated with reduced mortality rates, better health outcomes, and decreased costs (Franks and Fiscella 1998; Campbell et al. 2003; Shi et al. 2003). An increase of a single primary care physician per 10,000 residents was associated with a reduction of 1.44 deaths, a 2.5% reduction in infant mortality, and a 3.2% reduction of low birth weight for similar population size on average (Shi et al., 2004, 2005; Lee et al., 2007). This association holds up even in the presence of income inequalities and other health characteristics (Shi et al. 2003). Other research has shown that primary care plays a crucial role in mitigating adverse health effects created by income inequality (Shi et al., 1999). Adults who have

PCPs for regular care experienced lower mortality and incurred fewer healthcare costs (Franks et al. 1998). A higher proportion of PCPs in a given area have been shown to lead to decreased spending on healthcare (Chernew et al., 2009).

In the United Kingdom, the Quality and Outcomes Framework (QOF) was examined to assess its impact on ethnic disparities in diabetes outcomes (Alshamsan et al. 2012). As described previously, the QOF is a pay-for performance system that incentivizes primary care providers to achieve targets within clinical, patient experience, and organizational aspects of care. The study, conducted among a population of adults with diabetes, examined blood pressure, total cholesterol, and $HbA_{1c}$ levels across ethnicity, before and after the implementation of QOF. The study included 7,434 diabetic patients with a mean age of 59.1 years. Nearly one-half (47.5%) of the sample were white, 27.1% were black, and 24.7% were South Asian. Following QOF implementation, systolic blood pressure among Black diabetic patients was found to decrease and continued to decrease for the following three years. Significant changes were not found for $HbA_{1c}$ or total cholesterol, which may indicate the need for more targeted primary care interventions such improving care collaboration through adoption of a Patient Centered Medical Home (PCMH) model.

A US study that examined the Latino population sought to identify Latino subgroup variations by examining PCMH impact on disparities, and factors associated with Latinos having a PCMH in the US (Beal et al. 2009). The 2005 Medical Expenditure Panel Survey Household Component (MEPS-HC) was used for this analysis, and sampled 24,000 adults, including 6,200 Latinos. Self-reported preventive care and patient experiences were examined. The results revealed that white (57.1%) and Puerto Rican (59.3%) adults were most likely to have a PCMH, while Mexican/Mexican Americans

(35.4%) and Central/South Americans (34.2%) were least likely. This disparity was caused by a lack of access to regular providers. Respondents with a PCMH indicated higher rates of preventive care and positive patient experiences. Disparities in care were eliminated or reduced for Latinos with PCMHs. The regression models showed private insurance (less common among Latinos than whites) was an important predictor of having a PCMH. These findings have indicated that eliminating healthcare disparities required access to a PCMH.

### 2.4.4 Primary care and cost effectiveness

Primary care, through improved access to needed care and preventive services, has been shown to be cost-effective in balancing costs of care with improved quality of life, among other benefits. The provision of lifestyle interventions through primary care, namely aimed at the prevention of disease and chronic disease management, has been found to be particularly cost-effective. For example, Swedish researchers have examined the impact of a primary healthcare–based lifestyle intervention program on quality of life (QOL) and cost-effectiveness in Sweden over three years (Eriksson et al. 2010). A total of 151 men and women, aged 18 to 65 years, at moderate- to high-risk for metabolic syndrome were randomly assigned to either a lifestyle intervention with standard care or only standard care. Participants in the randomized-controlled trial were assigned to one of two intervention arms: (1) usual care with primary care provider and one meeting informing them of relationship between lifestyle and health; or (2) supervised exercise, dietary counseling, and usual care over a 3-year period. An economic evaluation was performed from a societal and health care perspective (Saha et al. 2013). In the cost-utility analysis, the costs, gained quality adjusted life-years (QALYs), and savings in healthcare were all

considered. Cost-effectiveness was also described by the net monetary benefit method. In the short-term, the researchers found that participation in the intervention at their primary care setting resulted in an average cost-savings of $500. In the long-term, the intervention would result in a cost-savings of $7,300 in the societal perspective and $1,500 in the health care perspective. Furthermore, the intervention was found to result in a gain of .46 QALYS per participant.

A German study examined the cost-effectiveness of primary care-based strategies to improve smoking cessation rates (Salize et al. 2009). The study looked at three smoking cessation strategies provided by general practitioners in Germany: (1) GP training plus GP remuneration for each abstinent patient; (2) GP training plus cost-free nicotine replacement medication and/or Bupropion hydrochloride; and (3) a combination of both (1) and (2). The trial was cluster-randomized and used cessation rates and intervention costs for 577 smoking patients of 82 GPs over 12-months. Smoking abstinence at 12-months was the primary outcome used to calculate incremental cost-effectiveness ratios and net monetary benefits. The results showed that intervention 1 was not effective compared with treatment as usual (TAU). Interventions 2 and 3 each proved to be more cost-effective compared separately with TAU. These findings have indicated that both treatments have a high potential to reduce smoking-related morbidity for low costs. This has been recommended for routine implementation by GPs since health insurance plans in many countries do not currently allow for funding of nicotine replacement therapy.

An economic analysis from the United Kingdom was conducted to assess the cost-effectiveness of QOF payments. This is an attempt to improve the quality of primary care in the United Kingdom using financial rewards (Walker et al. 2010). The study used 2004

and 2005 data on the QOF performance of all United Kingdom primary care practices. Cost-effectiveness evidence was studied in a subset of nine QOF indicators with direct therapeutic impacts. The authors of that study found that the proportional changes required to make QOF payments cost-effective varied widely among the indicators. It showed that QOF incentive payments were likely to be more useful and cost-effective for resources with a higher proportion of primary care practices.

A cost-effectiveness analysis of primary-care based interventions on obesity was conducted through a clinical trial of the Practice-based Opportunities for Weight Reduction at the University Pennsylvania (POWER-UP) (Tsai et al. 2013). In POWER-UP, participants were assigned to receive weight loss advice with usual care, brief behavioral counseling, or enhanced behavioral counseling, which included either weight loss food or medication. Following participation in the two-year study, the cost-effectiveness of the three intervention arms were calculated based on QALYS and weight data for the 390 participants from a payer perspective. The costs that were considered included the costs of the intervention along with medication and other health care costs. The study found that increasing the intensity of the interventions resulted in increased weight loss over the course of the study. The enhanced behavioral counseling resulted in an incremental cost per kilogram-year lost of $292 compared to weight loss advice with usual care. Comparisons with estimates of long-term cost per QALY provide support for long-term cost effectiveness of behavioral counseling through primary care for weight loss.

### 2.4.5 The Impact of Healthcare Reform on Primary Care

A number of industrialized countries have made healthcare reforms that seek to strengthen primary care delivery. Beginning in 2003, Quebec, Canada engaged in reforms to its provincial healthcare system to improve collaboration among healthcare organizations through the creation of family medicine groups (FMGs), a system of 95 geographically assigned networks of primary healthcare practices (Breton 2013). These networks allowed for the provision of primary care services through extend hours seven days a week, including access to imaging and laboratory testing. In addition to the creation and support of primary care networks, Quebec's reforms sought further collaboration with area hospitals and long-term care institutions. In an assessment of the extent of collaboration among primary care practices following Quebec's reforms, it was found that among primary care practices that were newly accredited as an FMG, collaboration increased from 31% to 75.9%, but existing clinics experienced no change (Breton 2013). While the reform showed promise for improved collaboration, it did not result in an overall improvement.

While measures of collaboration resulted in a lack of significant changes, other measures have pointed to reform's success in improving its primary care system. For example, patient perceptions of the quality of care were assessed after primary care reform in Quebec, Canada (Tourigny et al. 2010). This study used a before-and-after comparison for the perceptions of patients to evaluate how primary care reform affected patient experience regarding primary care. A random sample of 1,046 participants from five family medicine groups (FMGs) in two regions of Quebec in Canada completed both the baseline and follow-up questionnaires. The authors of this study found that perceptions of relational and informational continuity increased significantly, while

organizational, first-contact accessibility, and service responsiveness had no significant changes. Patient perceptions of physician-nurse coordination remained unchanged as well, but patient perception of primary care physician–specialist coordination decreased significantly. The proportion of participants that reported visits with nurses and reported use of FMG emergency services increased significantly from baseline to follow-up. These findings have suggested that the reorganization of primary care services will result in considerable practical changes in care that will lead to improvements in patient continuity of care but will not improve accessibility to care.

Beginning in the early 2000s, the United Kingdom initiated a series of reforms to its National Health Service with the intent of increasing per capita spending, increasing patient choice, and introducing a pay for performance scheme for primary care (Cookson et al. 2012). A recent study assessed changes in patient experience for primary care during health service reforms in the United Kingdom from 2003 to 2007 (Campbell et al. 2010). The researchers of that study conducted a cross-sectional study of family practices with questionnaires that were sent to patients in 42 representative general practices in the United Kingdom. Up to 12 patients with a confirmed diagnosis of each chronic illness (coronary heart disease, diabetes, or asthma) were randomly sampled in each run. Additionally, a random sample of 200 adult patients (excluding patients who reported long-term conditions) in each run were sent a questionnaire. The results showed that there were no significant changes in quality of care that were reported by either group of patients from 2003 to 2007 regarding communication, nursing care, coordination, and overall satisfaction. Certain aspects regarding access improved significantly for patients with chronic diseases, but not for the random samples. These findings have indicated that

there were only modest improvements in access to care for patients with chronic illnesses, but overall, patients find it harder to obtain care continuity. This outcome is related to incentives that provide rapid appointment or to an increased number of specialized clinics for primary care. The possibility of unintended effects needs consideration when pay for performance schemes are introduced.

Throughout the course of these reforms the number of primary care practitioners increased, with the UK, previously having the lowest practitioner to population ratio, surpassing Wales and Northern Ireland and maintaining a higher proportion by 2009 (Vizard & Obolenskaya 2013). While the UK's health reforms were instrumental in increasing the number of primary care providers, research has shown that it has not resulted in improved health equity. As of 2009, there were 63.9 primary care providers per a 100,000 population in the highest-income areas, compared to 56.9 in the lowest-income areas.

In 2009, China unveiled a $125 billion health care reform plan (Yip & Hsiao 2009). The reform aimed to:

- Expand insurance coverage, with universal coverage achieved in 2011, through subsidies to the rural population to enroll in the New Cooperative Medical Scheme (NCMS) and a public Urban Resident Basic Medical Insurance Scheme (URBMI) for uninsured urban residents;
- Increase spending on public health services, with focus on equalizing spending through increased expenditures in low-income areas;

- Establish primary care health centers in both urban are rural areas to serve as gatekeepers;
- Reform the pharmaceutical market; and
- Test public hospital reforms.

The intended overall impact of the reform was to improve equity in access to affordable health care and achieve these widespread improvements over the course of 3 years. By 2011, reforms to insurance programs resulted in coverage of more than 92% of the population (Yip et al 2012). The impact and implications of China's New Rural Cooperative Medical Scheme (NCMS) for rural primary healthcare were evaluated in a study that performed a difference-in-difference analysis to determine if the NCMS had corrected distortions regarding rural primary care and if the policy had affected the operation and use of village health clinics (Babiarz et al. 2010). A total of 160 village primary care clinics and 8,339 individuals in 25 rural counties across five provinces were involved. This study sought to evaluate the effect of NCMS by using individual-level and village clinic-level data that were collected in 2004 (shortly after the scheme was introduced in selected regions) and in 2007 (after expansion of the scheme to most rural areas). For individuals, NCMS was not clearly related to the use of medical care. Rrather, patients were re-directed away from specialized facilities to village clinics. At the clinic level, NCMS has increased clinic weekly patient inflows and gross incomes, but without annual net revenues. These increases in patient inflows and gross (not net) clinic income reflect desirable reductions to provision specialized, high profit margin services and drug sale rates. By 2011, China was on target to achieving its goals for building primary care infrastructure and training of providers (Yip et al. 2012). While preliminary data on

China's large-scale health care reform has indicated improvements in utilization, conclusive findings on its impact on equity of primary and public health services have yet to be achieved.

In the United States, the Patient Protection and Affordable Care Act (ACA) includes measures both to improve patient access to health care and to increase access to primary and preventive services to vulnerable populations. One provision of the legislation was the authorization of the Primary Care Extension Program, with the intended goal improving primary care efficacy through increasing primary care adoption of a Patient-Centered Medical Home (PCMH) model (Phillips 2013). One measure with the intended effect of increasing the primary care provider workforce authorized increases in reimbursement up to 10% and equalization of Medicare and Medicaid fees (Iglehart 2012). The primary care workforce under the ACA will be further bolstered through $1.5 billion in funding for the National Health Service Corps, with the effect of placing 15,000 primary care providers in vulnerable communities (NACHC 2010). In addition to increasing the number of primary care providers, ACA aims to improve access to primary care for vulnerable populations through increased funding for health centers (HCs). Under ACA, the expansion of HCs was allocated $11 billion to allow for expansion of currently operational health centers, initiation of new health centers, and improvements to facilities to better serve patients (NACHC 2010).

Finally, facilitators and barriers for implementing quality measurements in primary mental healthcare were systematically reviewed in a Canadian study on primary care (Addington et al. 2010). Content analysis of the 57 English-language articles published from 1996 to 2005 identified seven common categories of facilitators and barriers to

implement innovations, guidelines, and quality indicators. The authors of this study found that successful implementation of quality measures occurred, but their success depended on the interaction of multiple factors, including measure characteristics, promotional messages, implementation strategies, resources, the intended adopters, and the intra-organizational/ inter-organizational context.

## 2.5 Primary Care Problems in Taiwan

Primary care in Taiwan consists of a combination of Western and TCM clinics, but the majority are privately operated Western medicine clinics. In 2000, of the 11,863 clinics in Taiwan, 96% were private clinics and 79.2% were practicing Western medicine. In 2000, the population-to-doctor ratio was 15 doctors per 10,000 populations. The government also operated 368 health stations and 500 health rooms in the mountain and island areas.

The healthcare delivery system in Taiwan consists of different types of institutions that provide primary, secondary, and tertiary care. Clinics are classified as crucial primary care providers. However, since patients have the freedom to choose, providers and hospitals are organized in a closed system. Hospitals play an important role in primary care provision. Furthermore, not all clinicians have been trained as primary care providers. Many hospital physicians of various specialties choose to practice in the clinical sector and, consequently, change their career and practice patterns.

Physicians who were older, in later cohorts and who practiced concurrently in the hospital sector showed a lower rate of primary care practice. Physicians had higher primary care rates in the clinical sector. Physicians who previously practiced in different specialties had varied primary care rates. However, the primary care rates of surgeons and OB/GYN physicians were not that different from the reference group. Dermatologists had

the highest primary care rates. Fundamental issues for medical education include whether different types of primary care physicians are equally capable of providing primary care and the number of medical specialists needed in the healthcare system.

The Bureau of National Health Insurance (BNHI) launched a family doctor plan in March 2003 as part of a promotional effort to integrate primary care continuity including referrals for more specialized treatment as required. The program enabled families to obtain primary care through local clinics or neighborhood doctors that had networked with contracted hospitals. These general practitioners serve as preventive medicine consultants who develop complete medical records for each member of the family and provide information when demanded. The BNHI had contracted 88% of the community-based private clinics with each citizen able to access over 10,500 clinics and over 18,000 doctors in Taiwan.

## 2.6 Primary Care Research in Taiwan

Tsai et al. (2010a) used a recent patient survey to examine the relationship between a usual source of care (USC) and the quality of ambulatory medical care in Taiwan. This study was designed as a cross-sectional survey of 879 patients in Taichung County, Taiwan. Children and adults visiting hospital-based physicians were included in the sample. Quality of care was measured using items from the Primary Care Assessment Tool (PCAT) to represent seven ambulatory medical care domains: first contact (i.e., access and utilization), longitudinality (i.e., ongoing care), coordination (i.e., referrals and information systems), comprehensiveness (i.e., services available and provided), family centeredness, community orientation, and cultural competence. USC has been defined based on the responses of three survey items from the PCAT.

The results of the study have demonstrated that USC was significantly associated with higher medical care quality experiences. Specifically, USC was associated with seven ambulatory medical care domains. However, USC was not strongly related with the comprehensiveness of services, coordination of information systems, or healthcare provider community orientation. This study has concluded that in regions with universal health insurance, patients with USC reported higher quality experiences compared to those without USC. Efforts to improve quality of care must include policies promoting USC above health insurance coverage.

Using the same survey, the authors of another study assessed ambulatory patient experiences with medical care (Tsai et al. 2010b). They found that having a primary care physician was significantly associated with patients reporting a higher quality experience of primary care. Specifically, primary care physicians will enhance accessibility, achieve better community orientation, achieve better cultural competence, and provide more comprehensive services than specialty care physicians provide. This study has concluded that in areas with universal health insurance and unrestricted physician choice, ambulatory patients of primary care physicians rated medical care experience as superior to the patients of specialists. The promotion of primary care must include health policy to improve patient quality of ambulatory medical care experiences in addition to providing health insurance coverage.

There are some limitations of these studies. First, these studies were conducted in a single region and included a limited sample size. Therefore, the generalizability of the findings to other regions is restricted. Second, there were underlying differences between patients who choose USC and those who did not, which accounts for the differences in

perceived quality of care. Finally, the cross-sectional nature of the analysis offers limitations regarding the ability to make causal inferences from the findings. Thus, further research is necessary to capture a more representative sample of Taiwan.

## 2.7 Quality Assessment for Primary Care

Donabedian (1966) and Campbell et al. (2000) have proposed that quality of care incorporates structure, process, and outcomes. From productivity/efficiency literature, these are related to the inputs, throughputs, and outputs (Filipe-Amado and Dyson, 2008). Outputs, for example, mortality rates or surgical success rates, tended to be the "ultimate validators of the effectiveness and quality of medical care" (Donabedian, 1996). However, these limitations need to consider the process of care, i.e. the interaction between the user and the healthcare structure including both the technical application of clinical medicine and the interpersonal interactions to medicine being practiced appropriately and to the satisfaction of patients (Donabedian, 1966, 1983; Campbell et al., 2000). Finally, the consideration of the settings and structures where care takes place is important, i.e. staff, equipment, and buildings (Donabedian, 1966). All three elements must be studied since they are interconnected to evaluate medical care (Filipe-Amado and Dyson, 2008).

There were two dimensions of quality that are distinguished: generic dimensions and specific dimensions. Both of these are particular to primary care. Generic dimensions (Campbell et al. 2000) that are applicable to all healthcare services are as follows:

- accessibility of services
- clinical effectiveness
- interpersonal effectiveness

Whereas specific dimensions for typical attributes of a primary care system include:

- comprehensiveness, having a broad range of curative and preventive services
- continuity of care, having longitudinal care and interpersonal continuity
- coordination with other professionals and levels of care

Quality improvement activities in primary care cover both the generic and the specific dimensions. The focus of quality improvement for primary care is either for individual care such as adherence to clinical guidelines, or for population care such as social or geographical inequalities in utilization. Quality is focused on the structure of, the process for, or the outcomes of care, as classified in the aforementioned framework developed by Donabedian. 'Structure' refers to physical characteristics, such as premises, equipment, human resources, the organization, management of resources, and teamwork. 'Process' refers to the actual delivery of primary care, i.e. the clinical and interpersonal aspects. 'Outcomes' are the results or consequences of the process of care, i.e. health status or evaluations from patients. A solid quality assessment and improvement mechanism are classified based on the aforementioned framework.

## 2.8 Assessment of Primary Care

There are many instruments that measure primary care quality from the patient perspective. These instruments include the Primary Care Assessment Survey (PCAS) from the United States, the Primary Care Monitoring System (PC Monitor), the Primary Care Assessment Tool (PCAT), and the General Practice Assessment Survey/ Questionnaire in the United Kingdom (GPAS or GPAQ). These questionnaires were considered for use in our study to assess quality of primary care because of the following characteristics: 1) related to core attributes of primary care; 2) a combination of patient

report of experience and evaluation with primary care; 3) focused more on reporting rather than rating; 4) rigorous development and validation process; 5) widely applied in different cultural settings; and 6) collection of several equal items measuring a construct. These instruments were developed to operationalize activity of primary care delivery at the patient-provider interface with different structures and focuses (Vedsted and Heje 2008; Rao et al. 2006; Safran et al. 1998; Safran 2003; Bower et al. 2002; Vedsted et al. 2008; Shi et al. 2001).

PCAS (developed in 1996) is a 51-item patient-completed questionnaire designed to assess inter-relational aspects of care and another 56-item questionnaire regarding patient sociodemographic characteristics and health status is simultaneously administered. The contents of these questionnaires remain the same to enable the outcomes as a longitudinal study.

GPAS (developed in 1997) is a 53-item questionnaire that borrowed heavily from PCAS in terms of its theoretical foundations, structures, and contents. It measures patient experiences from seven multiple item scales regarding access, technical care, communication, interpersonal care, trust, knowledge of patient, nursing care, and two single item scales for reception and continuity of care. It has been validated and developed over time. The most recent (shorter version) GPAQ has become a major quality assessment tool under the United Kingdom Quality and Outcome framework designed to promote high quality care with financial innovations.

Indicators for the Primary Care Monitoring System (PC Monitor) were developed in Europe to be applied to 31 European countries (Kringos et al. 2010). The PC Monitor was developed in four steps: (1) a systematic review of the primary care literature

published from 2003 to 2008 to identify the dimensions and features of primary care; (2) development of indicators based on the results of the systematic literature review; (3) an evaluation among primary care experts of these indicators; and (4) testing the feasibility for implementation in 31 European countries. The crucial dimensions of primary care systems were captured at three levels: structure, process, and outcome. The structural levels include indicators for governance, economic conditions, and workforce development. Process level indicators describe access, comprehensiveness, continuity, and coordination of primary care services. Outcome level indicators reflect the quality and efficiency of primary care. The final set of 41 features, 99 indicators, and 44 additional information items have collectively defined the PC Monitor.

In the US, the PCAT was organized strictly around the core principles of primary care defined by both the IOM and the WHO. It was developed in the late 1990s with adult and child versions available in both expanded and short formats. Additionally, it is based on a broader conceptual framework, which includes organizational and system-level characteristics. There are versions for facilities, physicians, and a planning version for system level analyses. EUROPEP (developed in 1993) is a 23-item questionnaire that is used in Europe to evaluate patient experiences regarding primary care. Developed by European task groups, translated and validated in different European countries, it is one of the few instruments with system-level contributions to quality of care that has been scientifically examined by comparing survey results from different countries.

In Catalonia, Spain, an abbreviated 10-item PCAT questionnaire was incorporated into the Catalonia Health Survey to evaluate primary care from the population perspective (Rocha 2011). This was the first application of PCAT to the population

perspective of primary care and it was evaluated for its metric properties and consistency. Analysis of its implementation with the 2006 Catalonia Health Survey determined that the abbreviated PCAT demonstrated internal consistency and integrity with other items included in the population survey.

The PCAT has also been adapted and developed in Korea to measure primary care experience and quality (Lee et al. 2009). This study reviewed 190 items addressed in previous studies, developed a 25-item questionnaire, and used a cross-sectional survey for validation at 16 primary care clinics. An expert panel of nine was assembled for development and a total of 722 effective data sets were used for the analysis. The process created a Korean primary care assessment tool (KPCAT) that consists of four multi-item scales and one composite scale.

We decided to use the PCAT for our study for the following reasons: 1) PCAT has a set of tools designed to assess facilities and systems performance from the perspectives of patients and providers. A foundation for our efforts was built to explore future multidimensional influences in primary care quality. 2) The design of PCAT strictly parallels the definition of primary care promoted by the WHO, which is widely accepted in developing countries. Its consistency with core attributes of primary care provides a valuable scale structure and taxonomy that were applicable to Taiwan. 3) It is theoretical and scientifically practical. It is theoretical in that it does not focus purely on interpersonal relationships and communication to ensure the comprehensiveness of measurements. PCAT enhances the measurements of outcomes and the reliability of results. PCAT is scientifically practical due to a series of validation analyses of the PCAT conducted worldwide by Shi and colleagues. These studies have reported high content

and construct validity, internal consistency, and score reliability as an instrument. Theoretically, derived measures in core domains of primary care successfully represent the primary care scales (Safran et al. 1998; Shi et al. 2008; Flock et al. 2002; Cassady et al. 2000; Harzheim et al. 2006).

The Johns Hopkins Primary Care Assessment Tool (PCAT) uses patient experiences for primary care attributes to assess quality (Shi et al., 2003). These attributes are based on descriptions by the Institute of Medicine for quality attributes of primary care as follows:

- Accessibility and first-contact care related to the use of services for each new problem that arose,
- Ongoing care referred to the long-term relationship established between the patient and PCP,
- Coordinated care was associated with linking of healthcare visits and services to meet all health needs,
- Comprehensive care referred to the availability of a wide range of services, including health promotion and disease prevention,
- Family-centeredness reflected the role and impact of family in the assessment and treatment of a patient,
- Community orientation referred to care delivered in the context of the community.

# Chapter 3. Materials and Methods

## 3.1 Conceptual Framework

Our conceptual framework on primary care assessment was mainly developed based on the Health Behavior Model (HBM) and Primary Care Quality model (PCQ). The HBM model was developed by Anderson and Aday in 1995 (Anderson, 1995). Also in 1998, Starfield developed the PCQ model. This PCQ model, depicting essential structural and process features of primary care, adds a crucial dimension to the conceptual framework of our proposed study. Strong primary care within a health care system helps to achieve "efficient access" with better health outcomes and greater population satisfaction (Starfield, 1998). The essential attributes of primary care in this model, theoretically and practically amenable to measurement, have been reaffirmed by experts and practitioners worldwide as critically important.

The conceptual framework is illustrated in **Figure 1** and the detailed variables are presented in **Appendix 1**. This framework includes the demographics of the consumers, patient selection, which is adapted from Dixon (Dixon et al. 2010), organizational profile of primary care, primary care assessment measures (from PCAT), and the patient satisfaction assessment. We hope to separately screen the consumers with hospital or community-based primary care experiences in order to comprehend and compare their assessment on primary care quality and satisfaction in Taiwan. Therefore, in the section regarding consumer demography, we add an option for asking the consumers, in their experience with medical care, whether community- or hospital-based primary care is their first selection and most frequently used choice for medical treatment. If the consumers

select hospital-based primary care, we will ask them to review the quality of the primary care and characterize their satisfaction. If community-based primary care is selected as their most used point of care, community-based primary care will be reviewed. Finally, we will analyze and compare the results of primary care quality and satisfaction in Taiwan between hospital-based and community-based groups.

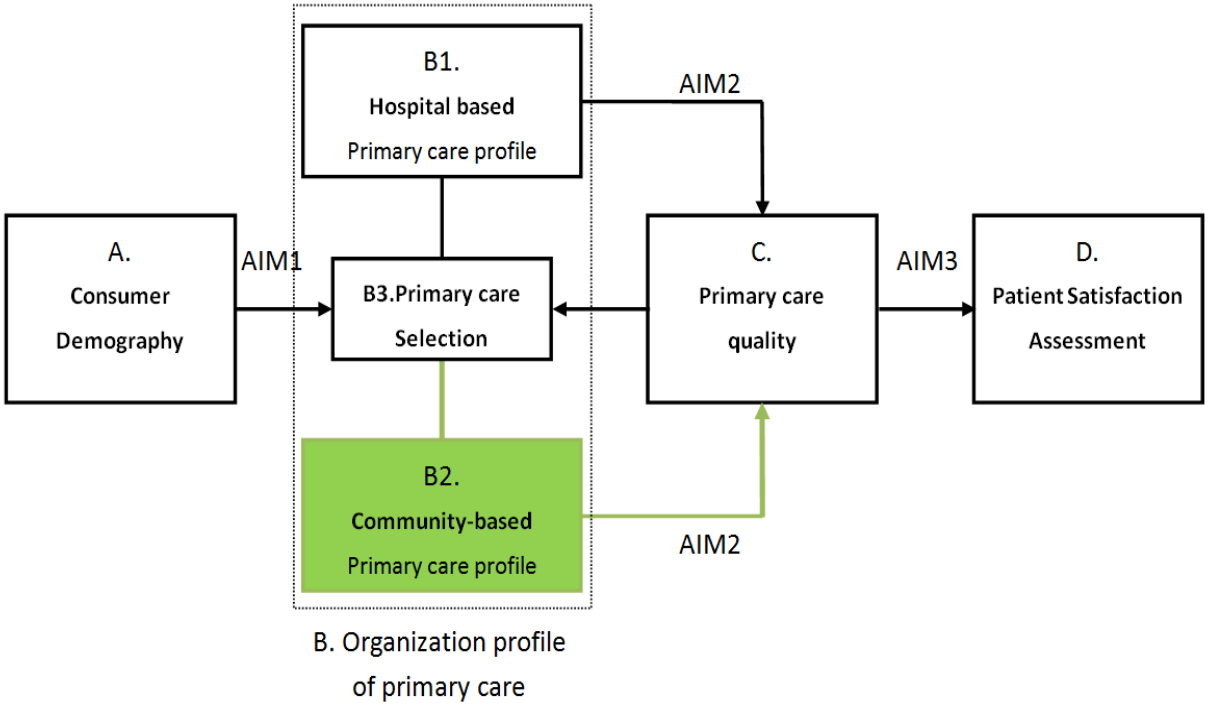


**Figure 1. Conceptual framework for primary care quality assessment**

## 3.2 Study Aims and Research Questions

The specific aims and associated research questions of the proposed study are listed as follows:

- **Aim 1:** To examine the factors associated with consumers' selection of primary care services provided in either community or hospital settings.

  **Research question 1:** What are the patient-level factors associated with selection of primary care services provided in community versus hospital settings?

- **Aim 2:** To compare the quality of primary care provided in community and hospital settings.

  **Research question 2:** Are community-based primary care services able to deliver comparable or higher quality care than hospital-based primary care services?

- **Aim 3:** To understand consumers' satisfaction with the family-physician model of primary care.

  **Research question 3:** What is consumers' satisfaction with the family-physician model of primary care?

## 3.3 Participants

The study population is comprised of all Taiwan residents so that the results can be reflective of the entire Taiwan area. Based on sample size power analysis, we selected a sample of 1,068 subjects, consisting of 765 subjects with community-based primary care experiences and 303 subjects with hospital-based experiences, all of whom fulfill the following criteria: age between 20 and 70 years and insured under the NHI program (National Health Insurance) in Taiwan. Subjects were selected from the eligible

population until the number of participants needed for this study was achieved. With this sample size, we expect to have a sampling error less than 0.3 percent and have sufficient data for quantitative analysis. The subjects were contacted by telephone and invited to participate in the study. Those who agreed were interviewed regarding the quality of primary care by using the Primary Care Assessment Tool. However, due to the nature of telephone interview, only 8.08% of phone calls and 15% of those reached resulted in a complete survey. See the chart below for the breakdown.

| Types | Number | Percentage |
|---|---|---|
| Completed | 1,068 | 8.08% |
| Rejection | 6,153 | 46.60% |
| No response (ringing >=6) | 2,452 | 18.57% |
| Wrong number | 1,553 | 11.76% |
| Fax | 745 | 5.64% |
| Breaking (Partial answering) | 234 | 1.77% |
| Total | 13,205 | 100% |

Compared to the national demographics, our sample is under-represented in the younger age group (those 20-29: 8.8% vs. 13.9%) and male population (36% vs. about 50%) but over-represented in the older age group (those 60-69: 22.4% vs. 9.4%) and female population (64% vs. about 50%). Our sample is also over-represented in the lower household income group (26.5% vs. about 6% for households with annual income less than NTU$300,000). Our sample is comparable to the national distribution of education with about 28% less than high school graduation.

## 3.4 Measurements

We used the Primary Care Assessment Tool (PCAT) Adult and Child editions for data collection (see **Appendix 2** for PCAT and **Appendix 3** for the bilingual instrument used in the interview with respondents). The PCAT was developed by the Johns Hopkins Primary Care Policy Center to measure the extent and quality of primary care services in provider settings, and is consistent with a focus on attributes of primary care that have been demonstrated to produce better outcomes of care at lower costs (Johns Hopkins Bloomberg School of Public Health, 2010). It focuses on patients' experiences with aspects of healthcare delivery, rather than satisfaction with delivery. The questionnaire, which takes approximately 20 minutes to complete, can be administered through telephone or face-to-face interviews, as well as by mail. Validation studies of the PCAT have been published and indicate that the hypothesized domains of primary care have substantial reliability and validity (Shi et al. 2001).

### 3.4.1 Domains of primary care

The validated PCAT consists of ten scales representing seven primary care domains: first contact (i.e., access and utilization), longitudinality (i.e., ongoing care), coordination (i.e., referrals and information systems), comprehensiveness (i.e., services available and provided), family centeredness, community orientation, and cultural competence.

First contact care implies accessibility to and use of services for each new problem or new episode of a problem for which people seek healthcare. Longitudinality presupposes the existence of a regular source of care and the characteristics of the interpersonal relationship between that source and the patient. Coordination of care requires some form of continuity, either by practitioners, medical records, or both, as well as recognition of problems that are addressed elsewhere and the integration of their care into the total care of patients. Comprehensiveness implies that primary care facilities must be able to provide or arrange for all types of healthcare services, including referrals to secondary services for consultation, tertiary services for specific conditions, and essential supporting services such as home care and other community services. Family centeredness, community orientation, and cultural competence refer to the provider's knowledge of community needs and social norms, as well as involvement in the community. These primary care domains are consistent with the Institute of Medicine's definition of primary care. Specific PCAT items representing the primary care domains are included in the Appendix.

For consistency in response and scoring, all items are represented by a 4-point Likert-type scale with '1' indicating "Definitely Not," '2' "Probably Not," '3' "Probably," and '4' "Definitely." The domain score for each domain is derived by summing the values for

all the items under each domain. The total score for overall quality of primary care experience is derived by summing the values for all domains.

### 3.4.2 Socio-demography, health status, and healthcare measures, satisfaction

The questionnaire includes questions about various socio-demographic characteristics (i.e., gender, age, education, employment, household income) and health status (i.e., self-perceived health status or whether the respondent had any physical or mental concerns that lasted for one year or longer). Healthcare measures include private insurance coverage in addition to national health insurance and provider specialty. For patients with a usual source of care (USC), this would be the specialty of their USC; for patients without a USC, this would be the specialty of their last place of care. The satisfaction evaluation used the PCP, PCP's recommendation and environment.

## 3.5 Data Collection

Data were collected through telephone interviews. The Survey Research Institute of Hunkuang University was contracted to provide this professional service. The Institute has a track record of securing high response rates (over 10%) in telephone interviews of Taiwanese residents. The planned length of the interview was approximately 20 minutes. An interview guide was developed covering the following topics (questionnaires is listed in the appendix 1):

- consumer demographics,
- hospital-based primary care profile
- community-base primary care profile
- primary care quality (PCAT)

- healthcare outcome
- satisfaction

The interviews were conducted in a systematic manner as follows: introduction of interviewer, simple introduction of research purpose, explanation of results from the survey, seeking of informed consent, and eliciting of initial response by asking whether the interpretation of survey results was correct. Interviews were closed by a short summary and participants were asked to comment on whether the main points had been addressed and understood. Interviews were recorded by CATI system (Computer-Assisted Telephone Interviewing) and, immediately afterwards, statistically processed. Analysis was carried out in the following sequence: (a) extraction of numerical data and (b) categorization of interview data according to topics covered and outlined in the guideline. (c) Verbatim quotations were used to illustrate categories and to describe subjects' perceptions.

## 3.6 Statistical Analysis

Descriptive and analytic statistics of the data obtained in this study were computed with the use of SPSS (Release 15.0) for Windows (SPSS, Chicago, Ill). In dealing with missing values, we used the method of replacing with the average of the variable to calculate the descriptive and interferential statistics. Descriptive statistics included frequencies, percentages, and means (±SD) for patient demographics, physician/medical care facility characteristics, primary care quality, and healthcare outcomes. Logistic regression analyses with stepwise selection were used to examine the potential association of independent variables. The overall aim of the analysis was to compare the quality of medical care experienced by community- versus hospital-based patients. We

first used Chi-square analyses to compare socio-demographic and health characteristics of patients from these two settings. Next, we used T-tests to compare quality of care indicators for patients from the two settings. Regression models were used to assess the association between settings and quality of medical care attributes after controlling for patients' socio-demographic, selecting of healthcare setting. Patient characteristics were included as control variables to account for differences that may influence some patients to choose a particular setting. Separate models were created for each primary care domain, as well as for overall quality of healthcare. Interaction terms were also added to examine the potential interaction between age and education and how that might affect the study hypotheses.

## 3.7 Reliability and Validity

The PCAT adult version has been repeatedly used and validated worldwide and complies with the internationally agreed-upon core attributes of primary care. For each domain, it applies a number of questions (ranging from 3 to 24) and thus secures comprehensiveness of measurement. It is a reliable tool to evaluate primary care quality, as indicated in our introduction of the PCAT in previous sections. However, the validity of the tool can be a concern given cultural differences in accessing healthcare between US and China. There are two types of validity: internal validity and external validity. Internal validity addresses the "adequacy and accuracy" (AA) of design in "demonstrating an association relationship between the independent and dependent variables" while "ruling out" confounding variables.

## 3.8 Limitations and Strengths

The study has several limitations:

- **Cross-sectional nature of the study:** since data will not be collected multiple times, it will not be possible to study causality.
- **Selection bias:** due to the voluntary nature of the study, some subjects may not choose to participate.
- **Perception vs. clinical evidence:** the study collects patients' perceptions which may differ from clinical evidence.
- **Low response rate:** due to the nature of data collection via telephone, the study will likely achieve a low response rate, making national generalizability a concern.

This study also has several strengths:

- **The pioneer study:** the study has several important elements that have never been previously studied, including the use of a comprehensive primary care assessment tool adapted for Taiwan and the study of both the hospital and community settings of primary care.
- **Sample size and power:** the study has large sample size and therefore the necessary power to conduct hypotheses testing.

## 3.9 Protection of Human Subjects

The study protocol was reviewed and approved by the Institutional Review Board of Changhua Christian Hospital and Johns Hopkins University before the study began. Respondents recruited for the study were provided informed consent before the survey.

# Chapter 4. Results

This chapter describes the results of this research. We will begin with the description of the respondent characteristics, followed by the analysis of each research question associated with the study aims as depicted in the conceptual framework.

## 4.1 Characteristics of Respondents and Primary Care Selection

Characteristics of the respondents are summarized in Table 1. There were 1,068 respondents, most of whom were female (64.1%) and over 30 years old. Almost three-quarters of respondents had a high school education or higher. Half were employed full-time, and approximately half reported no salary within one year. Two-fifths (41.8%) of the respondents lived in the northern region of Taiwan (living area as defined by Ministry of Interior, Taiwan). As for primary care (PC) selection, approximately 71.6% (765 respondents) responded to community-based primary care (CBPC) as their USC, and 28.4% (303 respondents) responded hospital-based primary care (HBPC). Comparisons between two PC settings are also shown in Table 1. Significant differences in education level, age, job status, income, and living area were found between these two settings. Those who selected HBPC had lower education and were older than those who selected CBPC. They were also more likely to be unemployed or retired, have no income, and live in the north, compared to the CBPC group. In Taiwan there are 20,935 (97.7%) CBPCs to serve the functions of primary care; therefore the accessibility is higher than the neighboring countries in Asia. Because six of the respondents live in the off-shore islands

which could not be categorized into any living area in Taiwan, to avoid the statistics errors in the following analysis, we discarded them and the sample size became 1,062.

**Table 1. Characteristics of respondents by primary care selection**

| Demographics | | Primary care selection n (%) | | |
|---|---|---|---|---|
| | | Total | HBPC | CBPC |
| Gender | Male | 383(35.9) | 109(36.0) | 274(35.8) |
| | Female | 685(64.1) | 194(64.0) | 491(64.2) |
| Education** | Less than high school | 296(28.0) | 111(36.9) | 185(24.5) |
| | High school | 281(26.6) | 73(24.3) | 208(27.5) |
| | College | 162(15.3) | 46(15.3) | 116(15.3) |
| | University | 266(25.2) | 57(18.9) | 209(27.6) |
| | Institute | 52(4.9) | 14(4.7) | 38(5.0) |
| Age** | 20-29 | 93(8.7) | 10(3.3) | 83(10.8) |
| | 30-39 | 154(14.4) | 24(7.9) | 130(17.0) |
| | 40-49 | 237(22.2) | 48(15.8) | 189(24.7) |
| | 50-59 | 344(32.2) | 123(40.6) | 221(28.9) |
| | 60-69 | 240(22.5) | 98(32.3) | 142(18.6) |
| Job status** | No job | 315(29.6) | 99(32.7) | 216(28.4) |
| | Full-time | 519(48.8) | 118(38.9) | 401(52.8) |
| | Part-time | 69(6.5) | 20(6.6) | 49(6.4) |
| | Retire | 160(15.1) | 66(21.8) | 94(12.4) |
| Income** | < 300,000 | 171(16.0) | 40(13.2) | 131(17.1) |
| | 300,000-599,999 | 283(26.5) | 67(22.1) | 216(28.2) |
| | 600,000-999,999 | 106(9.9) | 25(8.3) | 81(10.6) |

| | | | | |
|---|---|---|---|---|
| | >=1,000,000 | 29(2.7) | 5(1.6) | 24(3.1) |
| | No salary | 479(44.9) | 166(54.8) | 313(40.9) |
| Area** | North | 446(41.8) | 133(43.9) | 313(40.9) |
| | Mid | 259(24.3) | 59(19.5) | 200(26.1) |
| | South | 322(30.1) | 95(31.4) | 227(29.7) |
| | East | 35(3.3) | 12(4.0) | 23(3.0) |
| | Island | 6(0.6) | 4(1.3) | 2(0.3) |

Ps1. N: 1,068; Ps2. Chi-square test; Ps3. *: P<0.05, **: p<0.01

**Table 2. Selection of primary care settings and education and income**

| Selection | Education level | | | Income | | |
|---|---|---|---|---|---|---|
| (num/%) | Low (n=572) | High (n=479) | p-value | Low (n=646) | High (n=416) | p-value |
| Hospital | 181/31.6% | 116/24.2% | **0.008*** | 204/31.6% | 95/22.8% | **0.02*** |
| Clinical | 391/68.4% | 363/75.8% | | 442/68.4% | 321/77.2% | |

Ps1. The educational level was divided into by low (high school and below) and high (college and above) groups.
Ps2. The income level was divided into by low (below and included 300k/year) and high (above 300k/year) groups.
Ps3. * represented the significance (p <0.05) by $\chi$2-test

Table 2 shows the selection of primary care settings based on education and income. Those with higher education level tend to prefer clinical setting than those with lower education level (p=.008). Those with higher income level tend to prefer clinical setting than those with lower income level (p=.02).

## 4.2 Patient-level Factors Associated with Primary Care Selection

**Research question 1:** What are the patient-level factors associated with selection of primary care services provided in community versus hospital settings?

**Aim 1:** To examine the factors associated with patient selection of primary care services provided by either a community-based medical facility or hospital-based.

### 4.2.1 Association between primary care selection and patient-level factors

Table 3 presents regression results of the association between primary care selection and patient-level factors. Age was found to be the only factor associated with PC selection. Compared to people aged 20-29, age groups 40-49, 50-59, and 60-70 had significantly lower odds of choosing CBPC. PC selection was not found to be associated with other factors.

**Table 3. Association between PC selection and patient-level factors**

| | B | S.E. | P | OR | 95.0% C.I. | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| Intercept | 2.561 | .701 | .000 | 12.949 | | |
| Age | | | | | | |
| 20-29 | - | | | 1 | | |
| 30-39 | -.548 | .417 | .188 | .578 | .255 | 1.308 |
| 40-49* | -.890 | .394 | .024 | .410 | .190 | .889 |
| 50-59** | -1.644 | .381 | .000 | .193 | .092 | .408 |
| 60-70** | -1.692 | .404 | .000 | .184 | .083 | .407 |
| Job status | | | | | | |
| No job | - | | | 1 | | |
| Full time | -.168 | .570 | .768 | .845 | .277 | 2.581 |
| Part time | -.333 | .629 | .597 | .717 | .209 | 2.460 |
| Retired | -.073 | .224 | .746 | .930 | .600 | 1.442 |
| Income | | | | | | |
| <300,000 | - | | | 1 | | |
| 300,000-599,999 | -.120 | .257 | .641 | .887 | .536 | 1.468 |
| 599,999-999,999 | .080 | .338 | .813 | 1.083 | .558 | 2.102 |
| >=1,000,000 | .653 | .568 | .250 | 1.921 | .632 | 5.845 |
| No income | -.531 | .572 | .353 | .588 | .192 | 1.804 |
| Education | | | | | | |
| Less than high school | - | | | 1 | | |
| High school | .134 | .196 | .492 | 1.144 | .780 | 1.678 |
| College | -.073 | .232 | .754 | .930 | .590 | 1.466 |
| University | .061 | .227 | .787 | 1.063 | .681 | 1.659 |
| Institute | -.582 | .399 | .144 | .559 | .256 | 1.221 |

Ps1. Logistic regression was used; Ps2. Nagelkerke R2: .098; OR: Odds Ratio
Ps3. B: regression coefficient; SE: standard error; *:p < 0.05; **: p<0.01

### 4.2.2 Environmental factors affecting PC selection

Environmental factors affecting PC selection are listed in Table 4. Overall, friendliness (10.3%), caring quality (10.2%), and reputation (10.0%) were the first three factors that people cared about the most. Cleanness (9.9%), facility (9.8%), location (distance) (9.8%), and diagnostic time for physician (9.5%) were also important factors. The least important factors (percentage less than 5%) were registration method (5.0%), parking lot (4.5%), conversation time to physician (4.5%), medical expenditure (4.2%) and waiting time for physician (4.1%). By comparing the HBPC group and the CBPC settings, we found significant differences ($p < 0.05$) in the two settings' perspectives in terms of location (distance), waiting time for physician, way of registration, and medical expenditure. Specifically, a larger proportion of the CBPC settings considered location (distance), method of registration, medical expenditure, and waiting time for physician as important factors affecting PC selection. The reason that location or distance was more important for the CBPC settings is that convenience for people to get or maintain their primary care is a priority, especially for those with mild or chronic diseases who expect community-based settings to treat such kind of diseases as well as hospitals would do. However, for the HBPC settings, reputation and facility were more important than location, because the main function of hospitals is diagnosis and treatment of acute or severe illnesses. Therefore the experience of clinicians and facilities function are significant for patients to get good-quality care.

**Table 4. Environmental factors for primary care selection**

| **Selection factors** | Total (n/%) | HBPC (n=299) | CBPC (n=763) | p |
|---|---|---|---|---|
| Cleanness | 813/9.9 | 225/10.2 | 588/9.7 | .530 |
| Care quality | 842/10.2 | 232/10.6 | 610/10.1 | .394 |
| Diagnostic time of physician | 781/9.5 | 214/9.7 | 567/9.4 | .363 |
| Friendliness | 847/10.3 | 244/11.1 | 603/10.0 | .348 |
| Reputation | 826/10.0 | 224/10.2 | 602/10.0 | .160 |
| Level of hospital | 683/8.3 | 198/9.0 | 485/8.0 | .416 |
| Facility | 807/9.8 | 233/10.6 | 574/9.5 | .355 |
| Location (distance)** | 807/9.8 | 187/8.5 | 620/10.2 | .000 |
| Parking lot | 372/4.5 | 103/4.7 | 269/4.4 | .804 |
| Waiting time for physician* | 335/4.1 | 73/3.3 | 262/4.3 | .002 |
| Conversation time to physician | 374/4.5 | 106/4.8 | 268/4.4 | .920 |
| Method of registration** | 416/5.0 | 87/4.0 | 329/5.4 | .000 |
| Medical expenditure** | 343/4.2 | 71/3.2 | 272/4.5 | .000 |

Ps1. Chi-square test was used, Ps2.*: $P < 0.05$, **: $p< 0.01$

## 4.3 Quality Analysis between CBPC and HBPC System

**Research question 2:** Are community-based primary care able to deliver comparable or higher quality care than hospital-based primary care services?

**Aim 2:** To compare the quality of primary care provided in community and hospital settings.

### 4.3.1 Association between primary care quality (PCAT total score) between PC selection and socio-demographic characteristics

Primary care quality, measured by PCAT total score, was not found to be significantly different between CBPC and HBPC (see Table 5). No association was found between primary care quality and individual factors, except for high school education. The average PCAT total score of those with high school education was 0.087 points higher than the PCAT total score of those with less than high school education. The interaction term age*education was not found to be significant (see Table 6).

Separate analyses show that there was little difference between primary care quality and education (see Table 7) or income (see Table 8).

**Table 5. Association between primary care quality and PC selection**

| | Unstandardized Coefficients | | Standardized Coefficients | t | p |
|---|---|---|---|---|---|
| | B | S.E. | B | | |
| Intercept | 61.569 | 3.703 | | 16.629 | .000 |
| Selection | | | | | |
| HBPC | 0.000 | | | | |
| CBPC | -1.309 | .894 | -.046 | -1.464 | .144 |
| Age | | | | | |
| 20-29 | 0.000 | | | | |
| 30-39 | 3.005 | 1.736 | .083 | 1.731 | .084 |
| 40-49 | 1.509 | 1.688 | .049 | .894 | .371 |
| 50-59 | .060 | 1.664 | .002 | .036 | .971 |
| 60-70 | -.876 | 1.863 | -.029 | -.470 | .638 |
| Job status | | | | | |
| No job | 0.000 | | | | |
| Full time | -.027 | 3.108 | -.001 | -.009 | .993 |
| Part time | 2.581 | 3.443 | .049 | .750 | .454 |
| Retired | 1.865 | 1.358 | .053 | 1.374 | .170 |
| Income | | | | | |
| <300,000 | 0.000 | | | | |
| 300,000-599,999 | .352 | 1.349 | .012 | .261 | .794 |
| 599,999-999,999 | 2.240 | 1.761 | .053 | 1.272 | .204 |
| >=1,000,000 | -.954 | 2.762 | -.012 | -.345 | .730 |
| No income | -.072 | 3.112 | -.003 | -.023 | .982 |
| Education | | | | | |
| Less than high school | 0.000 | | | | |
| High school* | 2.501 | 1.121 | .087 | 2.232 | .026 |
| College | .870 | 1.324 | .025 | .657 | .511 |
| University | -.006 | 1.274 | .000 | -.004 | .996 |
| Institute | .723 | 2.189 | .012 | .330 | .741 |

Ps1. Multiple linear regression; Ps2. R: 0.150; Ps3. adjusted R2: 0.008

**Table 6. Association between PC quality and PC selection with interaction term**

| | B | S.E. | B | | |
|---|---|---|---|---|---|
| Intercept | 61.779 | 4.348 | | 14.208 | .000 |
| Selection | | | | | |
| HBPC | 0.000 | | | | |
| CBPC | -1.289 | .899 | -.046 | -1.434 | .152 |
| Age | | | | | |
| 20-29 | 0.000 | | | | |
| 30-39 | 3.032 | 2.344 | .084 | 1.293 | .196 |
| 40-49 | 1.355 | 3.252 | .045 | .417 | .677 |
| 50-59 | -.180 | 4.022 | -.007 | -.045 | .964 |
| 60-70 | -1.165 | 4.652 | -.038 | -.250 | .802 |
| Job status | | | | | |
| No job | 0.000 | | | | |
| Full time | -.095 | 3.109 | -.004 | -.031 | .976 |
| Part time | 2.534 | 3.444 | .049 | .736 | .462 |
| Retired | 1.829 | 1.381 | .051 | 1.325 | .186 |
| Income | | | | | |
| <300,000 | 0.000 | | | | |
| 300,000-599,999 | .357 | 1.356 | .012 | .264 | .792 |
| 599,999-999,999 | 2.273 | 1.764 | .054 | 1.288 | .198 |
| >=1,000,000 | -.906 | 2.763 | -.012 | -.328 | .743 |
| No income | -.063 | 3.112 | -.002 | -.020 | .984 |
| Education | | | | | |
| Less than high school | 0.000 | | | | |
| High school* | 2.357 | 1.960 | .082 | 1.202 | .229 |
| College | .662 | 3.118 | .019 | .212 | .832 |
| University | -.291 | 4.067 | -.010 | -.072 | .943 |
| Institute | .386 | 5.175 | .007 | .075 | .941 |
| Interaction (Age*Edu.) | .019 | .342 | .007 | .054 | .957 |

Ps1. Multiple linear regression; Ps2. R: 0.23; Ps3. adjusted R2: 0.006

**Table 7. PC quality by educational level**

| PCAT Dimension (m/SD) | Education level | | | | p-value |
|---|---|---|---|---|---|
| | Low (n=572) | | High (n=479) | | |
| **First utilization (3-12)*** | **9.3** | **2.47** | **8.9** | **2.58** | **.021** |
| **First access (4-16)*** | **9.2** | **3.00** | **9.7** | **2.90** | **.013** |
| **Ongoing care (3-12)*** | **9.0** | **2.89** | **8.4** | **3.07** | **.006** |
| Coordination (referrals, 3-12) | 6.2 | 2.47 | 6.4 | 2.47 | .255 |
| Coordination (information systems, 2-8) | 4.1 | 1.75 | 4.2 | 1.82 | .919 |
| Comprehensiveness (services available, 4-16) | 6.9 | 4.00 | 6.8 | 3.74 | .823 |
| Comprehensiveness (service provided, 5-20) | 10.6 | 4.60 | 10.5 | 4.66 | .844 |
| Family-centeredness (1-4) | 2.9 | 1.32 | 3.0 | 1.31 | .342 |
| Community orientation (1-4) | 1.5 | 0.94 | 1.5 | 0.94 | .994 |
| Cultural competence (1-4) | 3.2 | 1.13 | 3.3 | 1.11 | .680 |
| Primary care total score(27-108) | 62.9 | 12.50 | 62.6 | 12.94 | .769 |
| Satisfaction | 11.3 | 1.97 | 11.1 | 1.91 | .199 |

Ps1. The educational level was divided into by low (high school and below) and high (college and above) groups.
Ps2. * represented the significance ($p < 0.05$) by t-test

**Table 8. PC quality by income level**

| PCAT Dimension (m/SD) | Income | | | | p-value |
|---|---|---|---|---|---|
| | Low (n=646) | | High (n=416) | | |
| First utilization (3-12) | 9.1 | 2.55 | 9.1 | 2.47 | .963 |
| **First access (4-16)*** | **9.2** | **2.82** | **9.8** | **3.15** | **.000** |
| Ongoing care (3-12) | 8.8 | 2.95 | 8.6 | 3.03 | .184 |
| Coordination(referrals, 3-12) | 6.2 | 2.44 | 6.4 | 2.50 | .111 |
| Coordination (information systems, 2-8) | 4.1 | 1.75 | 4.1 | 1.83 | .858 |
| Comprehensiveness (services available, 4-16) | 6.8 | 3.86 | 7.0 | 3.96 | .411 |
| Comprehensiveness (service provided, 5-20) | 10.6 | 4.59 | 10.4 | 4.70 | .689 |
| Family-centeredness (1-4) | 3.0 | 1.31 | 3.0 | 1.32 | .825 |
| **Community orientation (1-4)*** | **1.5** | **0.88** | **1.6** | **1.01** | **.041** |
| Cultural competence (1-4) | 3.2 | 1.15 | 3.3 | 1.06 | .061 |
| Primary care total score(27-108) | 62.3 | 12.77 | 63.3 | 12.59 | .211 |
| Satisfaction | 11.1 | 1.93 | 11.3 | 1.96 | .123 |

Ps1. The income level was divided into low (≤ 300k/year) and high (> 300k/year) groups.
Ps2. * represented the significance ($p < 0.05$) by t-test

### 4.3.2 Comparison of primary care quality (domains) between CBPC and HBPC

We further compared scores for ten primary care domains between CBPC and HBPC. The results are shown in Table 9. In the unadjusted comparisons, there were no significant differences in domains of utilization, access, coordination (referrals), comprehensiveness (services available), comprehensiveness (services provided) and family-centeredness care between these two settings. Access, community orientation and cultural competence of CBPC were better than those of HBPC. On the other hand, the quality of ongoing care and coordination (information systems) in HBPC were better than those in CBPC settings.

We then adjusted the scores by age, job status, income and education to eliminate their effects on quality. No significant differences were found in comprehensiveness (services provided) or family centeredness. Patients who selected CBPC had significantly higher scores on domains of access, community orientation, and cultural competence. The HBPC settings was reported to have significantly better performance on utilization, ongoing care, coordination information systems and comprehensiveness (services available).

**Table 9. Comparison of PCAT between CBPC and HBPC settings**

| Unadjusted primary care (m ± SD) | Total | HBPC | CBPC | p |
|---|---|---|---|---|
| First utilization (3-12) | 9.1±2.52 | 9.3±2.65 | 9.1±2.46 | .222 |
| First access (4-16) | 9.4±2.97 | 9.2±3.03 | 9.5±2.94 | .098 |
| Ongoing care (3-12) * | 8.7±2.98 | 9.0±2.96 | 8.6±2.98 | .033 |
| Coordination(referrals, 3-12) | 6.3±2.47 | 6.2±2.50 | 6.3±2.45 | .456 |
| Coordination (information systems, 2-8) ** | 4.1±1.78 | 4.5±1.78 | 4.0±1.77 | .000 |
| Comprehensiveness (services available, 4-16) | 6.9±3.90 | 7.0±4.12 | 6.8±3.81 | .464 |
| Comprehensiveness (service provided, 5-20) | 10.5±4.63 | 10.7±4.61 | 10.4±4.64 | .354 |
| Family-centeredness (1-4) | 3.0±1.31 | 3.0±1.32 | 3.0±1.31 | .761 |
| Community orientation (1-4) ** | 1.5±.94 | 1.4±.83 | 1.6±.98 | .006 |
| Cultural competence (1-4) * | 3.2±1.11 | 3.1±1.15 | 3.30±1.10 | .026 |
| Primary care total score(27-108) | 62.7±12.71 | 63.3±13.28 | 65.50±12.48 | .349 |
| Adjusted primary care (m ± SE) | | | | |
| First utilization (3-12) * | | 9.2±.15 | 9.1±.09 | .021 |
| First access (4-16) ** | | 9.2±.17 | 9.5±.11 | .000 |
| Ongoing care (3-12) * | | 9.0±.18 | 8.6±.11 | .032 |
| Coordination(referrals, 3-12) * | | 6.3±.15 | 6.3±.09 | .031 |
| Coordination (information systems, 2-8) ** | | 4.4±.11 | 4.0±.07 | .003 |
| Comprehensiveness (services available, 4-16) * | | 7.1±.23 | 6.8±.14 | .019 |
| Comprehensiveness (services provided, 5-20) | | 10.7±.28 | 10.4±.17 | .933 |
| Family-centeredness (1-4) | | 3.0±.08 | 3.0±.05 | .066 |
| Community orientation (1-4) * | | 1.4±.06 | 1.6±.03 | .048 |

| | | | |
|---|---|---|---|
| Cultural competence (1-4) * | 3.2±.07 | 3.3±.04 | .001 |
| Primary care total score(27-108) | 63.6±.75 | 62.4±.47 | .287 |

Ps1. Unadjusted model which used the t-test; Adjusted model which used the MANOVA
Ps2. Model adjusted by covariates, covariates included age, education, income, job status.
Ps3. Scale: 4-point Likert-type scale with '1' indicating "Definitely Not," '2' "Probably Not," '3, Probably Yes, '4' Yes

### 4.3.3 Comparison of primary care domains by living area

There were significant differences in utilization, ongoing care; coordination (referrals), comprehensiveness (services provided), community orientation as well as total primary care score among the four living areas in Taiwan (see Table 10). In all of these domains, the north had significantly lower scores than the other areas, while the east had the highest scores. Specifically, the east area had significantly higher scores than the north on utilization, ongoing care, coordination (referrals), and community orientation. Community orientation was also better in the east than that in the middle. Moreover, the middle area had significantly higher quality of coordination (referrals) than the north. The south scored higher on comprehensiveness (services provided) than the north. Lastly, the north received significantly lower total PCAT scores than the other three areas.

**Table 10. Comparison of primary care domains by living area**

| PC domains | Living area | | | | P | Post test |
|---|---|---|---|---|---|---|
| | North(N) | Middle(M) | South(S) | East(E) | | |
| First utilization (3-12)* | 8.9±2.60 | 9.3±2.45 | 9.2±2.44 | 10.1±2.24 | 0.007 | E>N |
| First access (4-16) | 9.3±3.09 | 9.6±2.77 | 9.4±2.97 | 9.4±2.89 | 0.759 | |
| Ongoing care (3-12)* | 8.4±2.96 | 8.9±2.99 | 8.8±2.97 | 9.9±2.84 | 0.009 | E>N |
| Coordination (referrals, 3-12)* | 5.9±2.23 | 6.6±2.72 | 6.4±2.45 | 7.3±2.86 | 0.000 | M>N; E>N |
| Coordination (information systems, 2-8) | 4.1±1.83 | 4.3±1.76 | 4.0±1.73 | 4.7±1.80 | 0.108 | |
| Comprehensiveness (services available, 4-16) | 6.6±3.77 | 7.1±3.82 | 7.0±4.07 | 7.3±4.41 | 0.327 | |
| Comprehensiveness (services provided, 5-20)* | 9.9±4.57 | 10.7±4.56 | 11.0±4.73 | 11.6±4.35 | 0.005 | S>N |
| Family-centeredness (1-4) | 2.9±1.31 | 3.1±1.31 | 3.0±1.31 | 2.9±1.38 | 0.639 | |
| Community orientation (1-4)* | 1.5±0.92 | 1.5±0.90 | 1.6±0.95 | 1.9±1.22 | 0.039 | E>N E>M |
| Culturally competence (1-4) | 3.2±1.15 | 3.3±1.02 | 3.2±1.14 | 3.4±0.97 | 0.211 | |
| Total score* | 60.7±12.62 | 64.3±12.17 | 63.6±12.75 | 68.6±13.43 | 0.000 | M>N, S>N; E>N |

Statistics: One way ANOVA to test significance between primary care domains and living area. Post-hoc (Turkey) test for mean differences across regions.
*: $p < 0.05$; **: $p < 0.01$.

## 4.4 Satisfaction Analysis and Prediction from Primary Care Quality

**Research question 3:** What is consumers' satisfaction with the family-physician model of primary care?

**Aim 3:** To understand consumers' satisfaction on the family-physician model of primary care.

### 4.4.1 Association between primary care satisfaction and PC selection

When controlling by socio-demographic factors, there was no significant difference in primary care satisfaction between CBPC and HBPC (see Table 11). However, job status, income, and education were significantly associated with patient satisfaction. Specifically, the retired had higher satisfaction score than those with no jobs. Moreover, individuals whose income was above NT$300,000 were significantly more satisfied with the primary care they received compared to those with income below NT$300,000. In addition, those with college or institute education were significantly less satisfied than those with less than high school education. The interaction term age*education was not significant (see Table 12).

**Table 11. Association between primary care satisfaction and demography after controlling for PC selection**

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| | B | S.E. | B | t | p |
| Intercept | 10.593 | .563 | | 18.820 | .000 |
| Selection | | | | | |
| HBPC | 0.000 | | | | |
| CBPC | .122 | .136 | .028 | .898 | .369 |
| Age | | | | | |
| 20-29 | 0.000 | | | | |
| 30-39 | .408 | .264 | .074 | 1.545 | .123 |
| 40-49 | .233 | .257 | .050 | .910 | .363 |
| 50-59 | -.110 | .253 | -.027 | -.436 | .663 |
| 60-70 | -.247 | .283 | -.053 | -.873 | .383 |
| Job status | | | | | |
| No job | 0.000 | | | | |
| Full time | .159 | .472 | .041 | .337 | .736 |
| Part time | .641 | .523 | .080 | 1.225 | .221 |
| Retired* | .539 | .206 | .099 | 2.611 | .009 |
| Income | | | | | |
| <300,000 | 0.000 | | | | |
| 300,000-599,999* | .532 | .205 | .121 | 2.597 | .010 |
| 599,999-999,999* | .759 | .268 | .117 | 2.835 | .005 |
| >=1,000,000* | .873 | .420 | .073 | 2.079 | .038 |
| No income | .536 | .473 | .137 | 1.133 | .257 |
| Education | | | | | |
| Less than high school | 0.000 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| High school | .020 | .170 | .005 | .118 | .906 |
| College* | -.434 | .201 | -.081 | -2.159 | .031 |
| University | -.239 | .194 | -.053 | -1.236 | .217 |
| Institute* | -.912 | .333 | -.102 | -2.741 | .006 |

Ps1. Multiple linear regression was used, Ps2. R2: 0 .031, Adjusted R2: 0 .016

**Table 12. Association between primary care satisfaction and demography after controlling for PC selection and the interaction between age and education**

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| | B | S.E. | B | t | p |
| Intercept | 10.738 | .662 | | 16.226 | .000 |
| Selection | | | | | |
| HBPC | 0.000 | | | | |
| CBPC | .106 | .137 | .025 | .774 | .439 |
| Age | | | | | |
| 20-29 | 0.000 | | | | |
| 30-39 | .262 | .357 | .047 | .735 | .462 |
| 40-49 | -.002 | .495 | .000 | -.003 | .997 |
| 50-59 | -.417 | .612 | -.100 | -.680 | .496 |
| 60-70 | -.633 | .708 | -.135 | -.894 | .372 |
| Job status | | | | | |
| No job | 0.000 | | | | |
| Full time | .187 | .473 | .048 | .394 | .694 |
| Part time | .670 | .524 | .084 | 1.278 | .202 |
| Retired* | .569 | .210 | .105 | 2.710 | .007 |
| Income | | | | | |
| <300,000 | 0.000 | | | | |
| 300,000-599,999* | .509 | .206 | .116 | 2.468 | .014 |

| | | | | | |
|---|---|---|---|---|---|
| 599,999-999,999* | .743 | .268 | .115 | 2.769 | .006 |
| >=1,000,000* | .848 | .420 | .072 | 2.017 | .044 |
| No income | .539 | .474 | .138 | 1.138 | .256 |
| Education | | | | | |
| Less than high school | 0.000 | | | | |
| High school | -.062 | .298 | -.014 | -.208 | .835 |
| College* | -.620 | .475 | -.115 | -1.306 | .192 |
| University | -.511 | .619 | -.114 | -.825 | .409 |
| Institute* | -1.252 | .788 | -.140 | -1.589 | .112 |
| Interaction (Age*Edu.) | .029 | .052 | .068 | .558 | .577 |

Ps1. Multiple linear regression was used, Ps2. R2: 0.031, Adjusted R2: 0 .016

### 4.4.2 Association between primary care quality and satisfaction

Results of analyses unadjusted for socio-demographic characteristics (age, income, education, job status) are shown in Table 13. This result displays the multiple linear regression analysis without covariates for analyzing the association between satisfaction and primary care quality. Satisfaction was positively associated with utilization, access, ongoing care, and cultural competence. Among these domains, cultural competence has the highest coefficient (0.679), indicating that it is the major predictor of satisfaction towards primary care within both settings. Other domains with statistical significance but the correlation coefficients (B) are relatively small. In addition, satisfaction was negatively associated with coordination (referrals). This means that if the physicians in both settings (CBPC or HBPC) wanted to make referral for their patients, this could lead to a drop in confidence by their patients. This reflects that the referral or coordination

system in Taiwan has not been achieved as of yet. We also adjusted the socio-demographics to compare the effects of age, income, education and job status on satisfaction (Table 14). The result is same as the unadjusted analysis with the exception of comprehensiveness (service available). The interaction term age*education was not significant (see Table 15).

**Table 13. Association between PCAT quality and satisfaction (Unadjusted)**

| Model (Unadjusted) | Unstandardized coefficient | | Standardized coefficient | t | p | Collinearity | |
|---|---|---|---|---|---|---|---|
| | B | S.E. | B | | | Tolerance | VIF |
| Intercept | 5.948 | .230 | | 25.82 | .000 | | |
| First utilization (3-12) | .047 | .017 | .061 | 2.801 | .005 | .892 | 1.122 |
| First access (4-16) | .122 | .014 | .187 | 8.748 | .000 | .928 | 1.078 |
| Ongoing care (3-12) | .035 | .015 | .054 | 2.394 | .017 | .846 | 1.182 |
| Coordination (referrals, 3-12) | -.055 | .017 | -.070 | -3.176 | .002 | .871 | 1.148 |
| Coordination (information systems, 2-8) | -.026 | .024 | -.024 | -1.110 | .267 | .884 | 1.132 |
| Comprehensiveness (services available, 4-16) | .021 | .011 | .042 | 1.852 | .064 | .828 | 1.208 |
| Comprehensiveness (services provided, 5-20) | -.010 | .010 | -.024 | -.996 | .319 | .739 | 1.353 |
| Family-centered ness (1-4) | .013 | .033 | .009 | .393 | .694 | .870 | 1.149 |
| Community orientation (1-4) | -.048 | .045 | -.023 | -1.065 | .287 | .910 | 1.099 |
| Cultural competence (1-4) | 1.183 | .038 | .679 | 31.378 | .000 | .905 | 1.105 |

Ps1. Multiple linear regression was used; Ps2. R2=0.55, adjusted R2=0.45

**Table 14. Association between PCAT quality and satisfaction (Adjusted)**

| Model (adjusted) | Unstandardized coefficient | | Standardized coefficient | t | p | Collinearity | |
|---|---|---|---|---|---|---|---|
| | B | S.E. | B | | | Tolerance | VIF |
| Constant | 5.936 | 0.308 | | 19.293 | 0 | | |
| First utilization (3-12) | 0.038 | 0.017 | 0.049 | 2.226 | 0.026 | 0.873 | 1.145 |
| First access (4-16) | 0.129 | 0.014 | 0.196 | 9.061 | 0 | 0.906 | 1.104 |
| Ongoing care (3-12) | 0.031 | 0.015 | 0.047 | 2.076 | 0.038 | 0.831 | 1.204 |
| Coordination (referrals, 3-12) | 0.047 | 0.018 | -0.06 | -2.711 | 0.007 | 0.855 | 1.17 |
| Coordination (information systems, 2-8) | 0.025 | 0.024 | -0.023 | -1.059 | 0.29 | 0.876 | 1.142 |
| Comprehensiveness (services available, 4-16) | 0.023 | 0.011 | 0.046 | 1.994 | 0.046 | 0.817 | 1.224 |
| Comprehensiveness (services provided, 5-20) | 0.011 | 0.01 | -0.026 | -1.064 | 0.288 | 0.735 | 1.361 |
| Family-centered ness (1-4) | 0.017 | 0.033 | 0.012 | 0.519 | 0.604 | 0.859 | 1.164 |
| Community orientation (1-4) | 0.037 | 0.045 | -0.018 | -0.833 | 0.405 | 0.905 | 1.105 |
| Cultural competence (1-4) | 1.183 | 0.038 | 0.681 | 31.137 | 0 | 0.889 | 1.125 |

Ps1. Multiple linear regression was used; Ps2. R2=0.55, adjusted R2=0.45

**Table 15. Association between primary care quality and satisfaction with the interaction between age and education**

| | Unstandardized Coefficients | | Standardized Coefficients | t | P |
|---|---|---|---|---|---|
| | B | S.E. | B | | |
| **Unadjusted** | | | | | |
| First utilization (3-12) | .034 | .020 | .044 | 1.733 | .084 |
| First access (4-16)** | .135 | .016 | .206 | 8.350 | .000 |
| Ongoing care (3-12)* | .039 | .017 | .060 | 2.326 | .020 |
| Coordination (referrals, 3-12)* | -.044 | .020 | -.056 | -2.166 | .031 |
| Coordination (information systems 2-8) | -.049 | .028 | -.045 | -1.763 | .078 |
| Comprehensiveness** (services available, 4-16) | .037 | .013 | .073 | 2.768 | .006 |
| Comprehensiveness (services provided, 5-20) | -.017 | .012 | -.040 | -1.437 | .151 |
| Family-centeredness (1-4) | .025 | .038 | .017 | .661 | .509 |
| Community orientation (1-4) | -.080 | .051 | -.040 | -1.579 | .115 |
| Culturally competence** (1-4) | 1.225 | .044 | .694 | 27.886 | .000 |
| **Adjusted** | | | | | |
| First utilization (3-12) | .025 | .020 | .032 | 1.238 | .216 |
| First access (4-16)** | .146 | .017 | .221 | 8.755 | .000 |
| Ongoing care (3-12) | .033 | .017 | .051 | 1.949 | .052 |
| Coordination(referrals, (3-12) | -.039 | .021 | -.049 | -1.890 | .059 |
| Coordination (information systems, 2-8) | -.046 | .028 | -.042 | -1.635 | .103 |

| | | | | | |
|---|---|---|---|---|---|
| Comprehensiveness** (services available, 4-16) | .036 | .014 | .071 | 2.685 | .007 |
| Comprehensiveness (services provided, 5-20) | -.017 | .012 | -.040 | -1.435 | .152 |
| Family-centeredness (1-4) | .031 | .039 | .021 | .818 | .414 |
| Community orientation (1-4) | -.072 | .051 | -.036 | -1.421 | .156 |
| Culturally competence** (1-4) | 1.219 | .044 | .693 | 27.478 | .000 |
| Interaction (Age*Edu.) | .024 | .032 | .054 | .752 | .452 |

### 4.4.3 Association between satisfaction and primary care quality in CBPC

Table 16 presents the association between primary care satisfaction and primary care quality in community settings. Without controlling for socio-demographic characteristics, satisfaction was positively associated with access, ongoing care, comprehensiveness of services available, and cultural competence, but negatively associated with coordination (referrals). After adjusting by age, education, income, and job status, access, comprehensiveness of services available, and cultural competence remained positive influencing factors on primary care satisfaction. One point increase in access, comprehensiveness of services available, and cultural competence was associated with 0.220, 0.073, and 0.695 point increase in satisfaction scores, respectively. The interaction term age*education was not significant (see Table 17).

**Table 16. Association between primary care quality and satisfaction in CBPC**

| | Unstandardized Coefficients | | Standardized Coefficients | t | P |
|---|---|---|---|---|---|
| | B | S.E. | B | | |
| **Unadjusted** | | | | | |
| First utilization (3-12) | .034 | .020 | .044 | 1.733 | .084 |
| First access (4-16)** | .135 | .016 | .206 | 8.350 | .000 |
| Ongoing care (3-12)* | .039 | .017 | .060 | 2.326 | .020 |
| Coordination (referrals, 3-12)* | -.044 | .020 | -.056 | -2.166 | .031 |
| Coordination (information systems 2-8) | -.049 | .028 | -.045 | -1.763 | .078 |
| Comprehensiveness** (services available, 4-16) | .037 | .013 | .073 | 2.768 | .006 |
| Comprehensiveness (services provided, 5-20) | -.017 | .012 | -.040 | -1.437 | .151 |
| Family-centeredness (1-4) | .025 | .038 | .017 | .661 | .509 |
| Community orientation (1-4) | -.080 | .051 | -.040 | -1.579 | .115 |
| Culturally competence** (1-4) | 1.225 | .044 | .694 | 27.886 | .000 |
| **Adjusted** | | | | | |
| First utilization (3-12) | .025 | .020 | .032 | 1.260 | .208 |
| First access (4-16)** | .145 | .017 | .220 | 8.733 | .000 |
| Ongoing care (3-12) | .033 | .017 | .050 | 1.913 | .056 |
| Coordination(referrals, (3-12) | -.038 | .021 | -.048 | -1.849 | .065 |
| Coordination (information systems, 2-8) | -.046 | .028 | -.042 | -1.639 | .102 |

| | | | | | |
|---|---|---|---|---|---|
| Comprehensiveness** (services available, 4-16) | .037 | .013 | .073 | 2.775 | .006 |
| Comprehensiveness (services provided, 5-20) | -.017 | .012 | -.041 | -1.476 | .141 |
| Family-centeredness (1-4) | .031 | .038 | .021 | .811 | .417 |
| Community orientation (1-4) | -.072 | .051 | -.036 | -1.409 | .159 |
| Culturally competence** (1-4) | 1.222 | .044 | .695 | 27.689 | .000 |

Ps1. Multiple linear regression was used;
Ps2. Without controlling socio-demography, Unadjusted R2: 0 .570; Adjusted R2: 0.565;
Ps3. With controlling socio-demography, Unadjusted R2: 0 .578; Adjusted R2: 0.570

**Table 17. Association between primary care quality and satisfaction in HBPC with the interaction between age and education**

| | Unstandardized Coefficients | | Standardized Coefficients | t | p |
|---|---|---|---|---|---|
| | B | S.E. | B | | |
| **Unadjusted** | | | | | |
| First utilization (3-12)* | .081 | .032 | .110 | 2.497 | .013 |
| First access (4-16)** | .093 | .028 | .145 | 3.340 | .001 |
| Ongoing care (3-12) | .030 | .030 | .046 | .997 | .320 |
| Coordination (referrals, 3-12)* | -.069 | .033 | -.089 | -2.081 | .038 |
| Coordination (information systems, 2-8) | .021 | .047 | .019 | .451 | .653 |
| Comprehensiveness (services available, 4-16) | -.016 | .021 | -.035 | -.776 | .438 |
| Comprehensiveness (services provided, 5-20) | .007 | .021 | .017 | .350 | .726 |
| Family-centeredness (1-4) | -.009 | .063 | -.006 | -.139 | .890 |
| Community orientation (1-4) | .012 | .099 | .005 | .125 | .901 |
| Cultural competence (1-4)** | 1.078 | .075 | .635 | 14.450 | .000 |
| **Adjusted** | | | | | |
| First utilization (3-12)* | .078 | .033 | .106 | 2.354 | .019 |
| First access (4-16)** | .100 | .028 | .155 | 3.539 | .000 |
| Ongoing care (3-12) | .029 | .031 | .044 | .951 | .343 |
| Coordination(referrals, 3-12) | -.057 | .034 | -.073 | -1.691 | .092 |
| Coordination (information systems, 2-8) | .014 | .047 | .013 | .302 | .763 |
| Comprehensiveness (services available, 4-16) | -.014 | .022 | -.030 | -.655 | .513 |
| Comprehensiveness (services provided, 5-20) | .002 | .021 | .004 | .082 | .935 |
| Family-centeredness (1-4) | -.008 | .064 | -.005 | -.118 | .906 |
| Community orientation (1-4) | .019 | .099 | .008 | .188 | .851 |
| Cultural competence (1-4)** | 1.088 | .075 | .642 | 14.444 | .000 |
| Interaction (Age * Edu.) | .057 | .060 | .141 | .950 | .343 |

### 4.4.4 Association between satisfaction and primary care quality in HBPC

Table 18 shows the association between primary care quality and satisfaction in hospital-based primary care settings. Satisfaction was positively correlated with utilization, access, and cultural competence, but negatively correlated with coordination (referrals). Controlling by socio-demographic factors, utilization, access, and cultural competence were found positively associated with satisfaction. Cultural competence had the biggest effect on primary care satisfaction.

**Table 18. Association between primary care quality and satisfaction in HBPC**

| | Unstandardized Coefficients | | Standardized Coefficients | t | p |
|---|---|---|---|---|---|
| | B | S.E. | B | | |
| **Unadjusted** | | | | | |
| First utilization (3-12)* | .081 | .032 | .110 | 2.497 | .013 |
| First access (4-16)** | .093 | .028 | .145 | 3.340 | .001 |
| Ongoing care (3-12) | .030 | .030 | .046 | .997 | .320 |
| Coordination (referrals, 3-12)* | -.069 | .033 | -.089 | -2.081 | .038 |
| Coordination (information systems, 2-8) | .021 | .047 | .019 | .451 | .653 |
| Comprehensiveness (services available, 4-16) | -.016 | .021 | -.035 | -.776 | .438 |
| Comprehensiveness (services provided, 5-20) | .007 | .021 | .017 | .350 | .726 |
| Family-centeredness (1-4) | -.009 | .063 | -.006 | -.139 | .890 |
| Community orientation (1-4) | .012 | .099 | .005 | .125 | .901 |
| Cultural competence (1-4)** | 1.078 | .075 | .635 | 14.450 | .000 |
| **Adjusted** | | | | | |
| First utilization (3-12)* | .077 | .033 | .105 | 2.345 | .020 |
| First access (4-16)** | .098 | .028 | .152 | 3.486 | .001 |
| Ongoing care (3-12) | .027 | .030 | .042 | .902 | .368 |
| Coordination(referrals, 3-12) | -.060 | .034 | -.077 | -1.787 | .075 |
| Coordination (information systems, 2-8) | .017 | .047 | .015 | .355 | .723 |
| Comprehensiveness (services available, 4-16) | -.014 | .022 | -.029 | -.624 | .533 |
| Comprehensiveness (services provided, 5-20) | .004 | .021 | .009 | .176 | .861 |
| Family-centeredness (1-4) | -.009 | .064 | -.006 | -.137 | .891 |
| Community orientation (1-4) | .024 | .099 | .010 | .244 | .808 |
| Cultural competence (1-4)** | 1.084 | .075 | .640 | 14.417 | .000 |

Ps1. Multiple linear regression was used.
Ps2. Without controlling for socio-demographic variables, Unadjusted $R^2$: 0.534, Adjusted $R^2$: 0.518
Ps3. After controlling for socio-demographic variables, Unadjusted $R^2$: 0.545, Adjusted $R^2$: 0.552

# Chapter 5. Discussion

This thesis has three study aims and three associated research questions: 1) To examine the factors associated with consumers' selection of primary care services provided in either community or hospital settings (Research question 1: What are the patient-level factors associated with selection of primary care services provided in community versus hospital settings?); 2) To compare the quality of primary care provided in community and hospital settings (Research question 2: Are community-based settings able to deliver comparable or higher quality care than hospital-based primary care services?); and 3) To understand consumers' satisfaction on the family-physician model of primary care (Research question 3: What is consumers' satisfaction level with the family-physician model of primary care?). The conceptual framework that provides guidance for accomplishing these three study aims was informed by a systematic literature review of the relevant topics. It consists of the outcomes of interest (which include primary care assessment measures (from PCAT), and the patient satisfaction assessment) and three major determinants: individuals' personal factors such as demographic and socioeconomic characteristics, individuals' care selection pattern, and the organization setting of primary care.

This chapter summarizes how the study aims are addressed through analyzing the research questions, examines how these results compare with the literature, discusses the implications of these results for both policy and practice, identifies limitations of the study, and points towards future research priorities to continue this line of inquiry.

## 5.1 Summary of Study Findings

### 5.1.1 Primary care selection

**Study Aim 1:** To examine the factors associated with consumers' selection of primary care services provided in either community or hospital settings.

**Research question 1:** What are the patient-level factors associated with selection of primary care services provided in community versus hospital settings?

There were 1,068 respondents in this survey, 71.6% of whom chose CBPC and 28.4% chose HBPC. Among the patient level factors, age was the only one affecting primary care selection. Younger individuals aged 20-29 were more likely to choose CBPC. Other common factors both groups were more likely to consider when choosing primary care settings included friendliness (10.3%), care quality (10.2%), reputation (10.0%), cleanness (9.9%), facility (9.8%), location (9.8%), and diagnostic time of physician (9.5%). Furthermore, location (distance) was more important for the CBPC settings than for the HBPC settings. One explanation for this is that for the CBPC settings, convenience is considered a priority of primary care, especially for those with mild or chronic diseases. They also expect that CBPC settings would treat such kind of diseases as well as hospitals'.

### 5.1.2 Primary care quality

**Study Aim 2:** To compare the quality of primary care provided in community and hospital settings.

**Research question 2:** Are community-based settings able to deliver comparable or higher quality care than hospital-based primary care services?

Although no disparity in quality was found between CBPC and HBPC, significant differences in primary care domains were identified. HBPC outperformed CBPC in five domains: utilization, ongoing care, coordination (referrals), coordination information systems, and comprehensiveness of services available, while CBPC received higher scores than HBPC in three domains: access, community orientation, and cultural competence. On the one hand, this strongly demonstrated the unique characteristics of primary care based in communities. However, it also indicated that primary care quality in communities is not as strong compared to primary care quality in hospital settings.

In addition, regional disparities in quality of primary care are significant. The northern part of Taiwan has the worse quality among the four areas in most of all primary care domains as well as overall primary care. This could be due to the specialty concentration in the north where primary care is somewhat neglected. The north in Taiwan is an urbanized area. The people who live here have more choices than others on physicians or hospitals selection for health care. According to the statistics of hospital distribution from DOH in Taiwan, there are 41.7% (17,676) hospitals or clinics located in the north; the middle and the south have 26.1% (11,095) and 27.8% (11,810), and the east only has 3.6% (1,520) hospitals or clinics. This distribution of hospitals and clinics is the cause behind disparities in quality of primary care.

### 5.1.3 Patient satisfaction assessment

**Study Aim 3:** To understand consumers' satisfaction with the family-physician model of primary care.

**Research question 3:** What is consumers' satisfaction level with the family-physician model of primary care?

No significant differences in overall patient satisfaction were found between CBPC and HBPC settings. After controlling for socio-demographic factors, cultural competence appeared to be the most influential factor of patient satisfaction for both settings. One reason for this phenomenon lies in patients' loyalty or confidence. If one patient was satisfied with a provider, he or she would recommend the provider to friends and relatives.

## 5.2 Comparison with Previous Research

Similar to previous research, our study demonstrated the advantages of CBPC settings to improve access to care, provide care that is oriented toward the health needs of communities, and adapt to the culture of communities. However, our study did not identify better quality of CBPC settings, especially in the domains of utilization, ongoing care, coordination and comprehensiveness of services which are regarded as features of CBPC settings. In addition, patient satisfaction was not found to be higher in CBPC settings. Overall, the results of our study are not consistent with the effectiveness of CBPC settings demonstrated by a large number of previous studies. This could be due to the lack of promotion of non-hospital setting for primary care delivery in Taiwan.

## 5.3 Implications of Study Results

Results from this study have significant implications for both policy makers and primary care providers. There is an urgent need for Taiwan's primary care system, especially the CBPC settings, to be improved. CBPC settings are chosen by the majority of Taiwanese

as their major source of primary care. However, quality of PC is far behind other industrialized countries and the unique features of PC were not recognized by the public. This requires great efforts by the government to enhance the system and to train competent PC providers who are able to fulfill the role of providing accessible, continuous, comprehensive, coordinated, community-centered, and culturally adapted primary care. Moreover, greater attention should be paid to the eastern part of Taiwan. Based on the findings of this study, the following recommendations are made to improve PC in Taiwan.

- Enhance the training of PC workforce by increasing the number of generalists such as family practice and general practice physicians.
- Improve the referral system so that primary care providers serve as gatekeepers. The current system that promotes 'doctor shopping' needs to be corrected.
- Provide incentives to the practice of PC to reward PC providers similar to the level of specialists.
- Provide incentives to seeing primary care providers by eliminating copayment for PC visits.
- Strengthen the provision of PC at the community setting by encouraging the development of community health centers and shifting PC services from the hospital settings.

## 5.4 Study Limitations

There are several limitations within this study. First, the cross-sectional nature of this study dictates that only associations could be identified and causal relationships could not be inferred. Secondly, measures that were based on self-report by the patients may be subject to recall or response bias, and thus limited our ability to measure the technical quality of PC. Third, low response rates make it difficult to generalize our findings to the

Taiwan population. Lastly, in this study we mainly focused on measuring process quality from the perspective of patients. However, providers' insights into quality of care are equally important for improving the PC settings in Taiwan. Moreover, quality of care also includes health outcomes, such as disease-specific mortality and morbidity, hospitalization rates, and emergency department visits, which should be examined in future studies.

## 5.5 Future Research Direction

Future research should focus on the several additional aspects. Firstly, longitudinal studies of quality and satisfaction of primary care should be conducted to examine the trend and identify more influencing factors. Therefore, similar studies should be performed every one or two years. Secondly, as mentioned before, providers' perspectives and health outcomes of the population should be included as measures of quality of care. Furthermore, to provide better evidence for the government to allocate resources, cost-effectiveness analyses of primary care programs or similar studies should be conducted. Lastly, individual characteristics, such as age, education, income and job status, were found to be associated with primary care selection, quality and satisfaction. Hence, specific population groups, especially the vulnerable populations, should also be a focus of future research. The generalizability of the study results is also limited by its relatively low response rate. Future studies must enhance response rate by incorporating incentives and more intensive follow-up methods or through different ways of data collection.

## 5.6 Conclusion

More people in Taiwan chose CBPC over HBPC settings. However, the CBPC settings in Taiwan is far from fulfilling the roles of a high-quality primary care system, and thus needs further efforts from policy makers, providers, and researchers.

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## Appendix 1 Description of variables for each component in the conceptual framework

**A Consumer demographics**

1 Age
2 Sex
3 Education
4 Income
5 Living area
6 Access to health care:
    1 How long have you been using health care services
    2 Did you choose, or were you assigned to, this doctor
    3 Have you ever visited a specialist or made a visit for special services
    4 In the past year, did you have trouble paying for health care

**B1. HBPC setting profile**

1 Service attitude
2 Environment and facilities
3 Access
- location (distance)
- parking lot
- waiting time for physician
- conversation time to physician
- Way of registration

**B2. CBPC setting profile**

1 Service attitude
2 Environment and facilities
3 Access
- location (distance)
- parking lot
- waiting time for physician
- conversation time to physician
- Way of registration

**B3. Primary care selection**

1 Selection of PC
2 Cleanliness
3 Quality of care
4 Diagnostic time
5 Friendliness of staff
6 Hospital reputation
7 Type of institution (HBPC/CBPC)

8 Facilities

**C Primary care quality (from PCAT, see Appendix 2)**

1 Extent of affiliation with a place/doctor
2 First contact-utilization
3 First contact-access
4 Ongoing care
5 Coordination (referrals)
6 Coordination (information systems)
7 Comprehensiveness (services available)
8 Comprehensiveness (services provided)
9 Family-centeredness
10 Community orientation
11 Culturally competence
12 Insurance questions

**D Patient satisfaction assessment**

1 Health status
2 Overall satisfaction
(including PCP recommendation and satisfaction to PCP and environment)

# Appendix 2: PRIMARY CARE ASSESSMENT TOOL – SHORT VERSION

**(Consumer-client survey**)**

Primary Care Policy Center
Johns Hopkins University
School of Hygiene and Public Health

***Note: First page is for interviewer-administered. The remainder are for both interviewer-administered and self-administered.*

ADMINISTRATIVE INFORMATION

Case number: _____

Interviewer's name: _____

Time interview began: |__|__|:|__|__| Time interview finished: |__|__|:|__|__|

Date survey conducted: |__|__| |__|__| |__|__|
M M D D Y Y

---

INTRODUCTION/SCREENING QUESTIONS

PURPOSE OF THE SURVEY

Interviewer: Hello, my name is_____. I'm calling from _____.
We're doing a survey in your neighborhood to find out what you think about the health care you get.

4. Is this a convenient time for you to talk with me? _____

1 Yes (**Go to consent**.)

2 No (Ask question below.)

When would be a good time for me to call back?

Record response _____ and say:

Thank you for your time; I will call back at that time to speak to you.

SUGGESTED CONTENT FOR CONSENT (if respondent indicates that s/he is interested in the survey):

Interviewer: Let me tell you a little more about the survey. The purpose of this survey is to talk directly with people about their experiences, good or bad, in getting health care. The interviews will help us know what services need to be improved.

You will be interviewed by myself or another trained interviewer over the phone. The interview will take a total of 30 minutes.

There are no direct advantages to you for answering the questions, but the results of this study are very important in helping to improve health care in (location, town, state).

Although there are no risks in this type of study, the interview does require some of your time. Also, some people may think the interview is an invasion of privacy. But, within the law, the answers you give are kept confidential or "private."

The study information will be used only as part of a health care study. Your name and address are *not* part of the interview information, so your answers will *not* be able to be identified. Because the answers people give are private and confidential, only the study team will see the surveys.

Your participation in this survey is completely voluntary. You have the right to skip certain questions or stop the interview at any time. Whatever you decide, it will not change the health care you usually get or your employment.

5. Would you be willing to answer survey questions about getting health care? _____

1 Yes (**Go to question A1**.)

2 No (Terminate interview by saying: Thank you for your time. I apologize for any inconvenience. Goodbye.)

## A. EXTENT OF AFFILIATION WITH A PLACE/DOCTOR

A1. Is there a doctor or place that you usually go if you are sick or need advice about your health? _____

a☐ No

b☐ Yes (Please give name and address.)

Name of doctor or place: _____

Address: _____

A2. Is there a doctor or place that knows you best as a person? _____

a☐ No

b☐ Yes, same place as above

c☐ Yes, different place (Please give name and address.)

Name of doctor or place: _____

Address: _____

A3. Is there a doctor or place that is most responsible for your health care? _____

a☐ No

b☐ Yes, same as #A1 & #A2 above

c☐ Yes, same as #A1 only

d☐ Yes, same as #A2 only

e☐ Yes, different from #A1 & #A2 (Please give name and address.)

Name of doctor or place: _____

Address: _____

If all three places are the same, please answer all the rest of the questions about this doctor or place. (Go to next page.) →

If any two of the places are the same, please answer all the rest of the questions about that doctor or place. (Go to next page.) →

If all three places are different, answer all the rest of the questions about the doctor or place in question A1. (Go to next page.) →

If you answered NO to two questions, answer all the rest of the questions about the doctor or place in the question you answered YES. (Go to next page.) →

If you answered <u>NO to all three questions</u>, please write in the name of the ***last*** doctor or place you went to:

Name of doctor or place: _____

Address: _____

We will call this doctor or place your PCP in all the rest of the questions.

A8. About *how many times total* have you been there? _____ times

A9. How long have you been going there?

1□ Less than 6 months

2□ Between 6 months and one year

3□ 1 – 2 years

4□ 3 – 4 years

5□ 5 or more years

6□ Too variable to specify

9□ Not sure/don't remember

## B. FIRST CONTACT – UTILIZATION

Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| B1. | When you need a regular general checkup, do you go to your PCP before going somewhere else? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| B2. | When you have a new health problem, do you go to your PCP before going somewhere else? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| B3. | When you have to see a specialist, does your PCP have to approve or give you a referral? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## C. FIRST CONTACT – ACCESS

Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| C3. | When your PCP is *open* and you get sick, would someone from there see you the same day? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| C4. | When your PCP is *open*, can you get advice quickly over the phone if you need it? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| C5. | When your PCP is *closed*, is there a phone number you can call when you get sick? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| C7. | When your PCP is *closed* and you get sick *during the night*, would someone from there see you that night? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## D. ONGOING CARE

| Please check the **one** best answer. | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| D1. | When you go to your PCP's, are you taken care of by the *same* doctor or nurse each time? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| D4. | If you have a question, can you call and talk to *the doctor or nurse who knows you best*? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| D7. | Does your PCP know you very well as a *person*, rather than as someone with a medical problem? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| D9. | Does your PCP know what problems are most important to you? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## E. COORDINATION

E2. Have you ever had a visit to any kind of specialist or special service? ____

1□ Yes

2□ No (**Skip to question F1**.)

9□ Not sure/don't remember (**Skip to question F1**.)

| Please check the **one** best answer. | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| E8. | Did your PCP discuss with you different places you could have gone to get help with that problem? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| E9. | Did your PCP or someone working with your PCP help you make the appointment for that visit? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| E10. | Did your PCP write down any information for the specialist about the reason for the visit? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| E12. | After you went to the specialist or special service, did your PCP talk with you about what happened at the visit? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## F. COORDINATION (INFORMATION SYSTEMS)

Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| F1. | When you go to your PCP, do you bring any of your own medical records, such as shot records or reports of medical care you had in the past? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| F2. | Could you look at your medical record if you wanted to? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| F3. | When you go to your PCP, is your medical record always available? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## G. COMPREHENSIVENESS (SERVICES AVAILABLE)

Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| Following is a list of services that you or your family might need at some time. For each one, please indicate whether it is available at your PCP's office. | | | | | | | |
| G2. | Immunizations (shots) | 4□ | 3□ | 2□ | 1□ | 9□ | |
| G6. | Family planning or birth control methods | 4□ | 3□ | 2□ | 1□ | 9□ | |
| G8. | Counseling for mental health problems | 4□ | 3□ | 2□ | 1□ | 9□ | |
| G10. | Sewing up a cut that needs stitches | 4□ | 3□ | 2□ | 1□ | 9□ | |

## H. COMPREHENSIVENESS (SERVICES PROVIDED)

The next questions deal with different types of health care services that you sometimes get. Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| In visits to your PCP, are any of the following subjects discussed with you? | | | | | | | |
| H1. | Advice about healthy foods and unhealthy foods or getting enough sleep | 4□ | 3□ | 2□ | 1□ | 9□ | |
| H2. | Home safety, like getting and checking smoke detectors and storing medicines safely | | | | | | |
| H4. | Ways to handle family conflicts that may arise from time to time | 4□ | 3□ | 2□ | 1□ | 9□ | |
| H5. | Advice about appropriate exercise for you | 4□ | 3□ | 2□ | 1□ | 9□ | |
| H7. | Checking on and discussing the medications you are taking | 4□ | 3□ | 2□ | 1□ | 9□ | |

## I. FAMILY-CENTEREDNESS

These next questions are about the relationship of your health care providers with your family. Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| I1. | Does your PCP ask you about *your* ideas and opinions when planning treatment and care for you or a family member? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| I2. | Has your PCP asked about illnesses or problems that might run in your family? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| I3. | Would your PCP meet with members of your family if you thought it would be helpful? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## J. COMMUNITY ORIENTATION

Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| J1. | Does anyone at your PCP's office ever make home visits? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| J2. | Does your PCP know about the important health problems of your neighborhood? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| J3. | Does your PCP get opinions and ideas from people that will help to provide better health care? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## K. CULTURALLY COMPETENT

Please check the **one** best answer.

| | | Definitely | Probably | Probably not | Definitely not | Not sure/don't remember | |
|---|---|---|---|---|---|---|---|
| K1. | Would you recommend your PCP to a friend or relative? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| K2. | Would you recommend your PCP to someone who does not speak English well? | 4□ | 3□ | 2□ | 1□ | 9□ | |
| K3. | Would you recommend your PCP to someone who uses folk medicine, such as herbs or homemade medicines, or has special beliefs about health care? | 4□ | 3□ | 2□ | 1□ | 9□ | |

## L. INSURANCE QUESTIONS

These are some questions about how you pay for your health care. Please check the **one** best answer.

L1. How much of the past 12 months were you covered by *any* type of health insurance, including Medicaid? ____

4□ All year

3□ Most months

2□ Only a few months or weeks

1□ Never

9□ Not sure/don't remember

| | | Yes | No | Not sure/don't remember | |
|---|---|---|---|---|---|
| | During the last 12 months, was any of your health care paid through: | | | | |
| L2. | HMO (health maintenance organization) | 1□ | 2□ | 9□ | |
| L3. | Some other private health insurance company | 1□ | 2□ | 9□ | |
| L4. | Medicaid or Medical Assistance | 1□ | 2□ | 9□ | |
| L5. | Some governmental health department clinic | 1□ | 2□ | 9□ | |
| L6. | Personal income (cash, check, credit card) | 1□ | 2□ | 9□ | |
| L8. | Any other way (Specify.) _____ | | | | |

## M. HEALTH ASSESSMENT

Please check the **one** best answer.

M1. Would you say your health is: ____

1□ Excellent 2□ Very good 3□ Good 4□ Fair 5□ Poor

M2. Do you have any physical, mental, or emotional problem that has lasted or is likely to last longer than one year? ____

1□ Yes 2□ No 9□ Not sure/don't remember

## N. DEMOGRAPHIC/SOCIOECONOMIC CHARACTERISTICS

These are several questions about you and your family.

N1. Are you: 1□ Male 2□ Female ____

N2. What is your age in years? _____

N3. What is your residence zip code? _____

N4. Are you:

1□ African-American

2□ White

3□ Hispanic or Latino

4□ Native African

5□ Native American/American Indian/Alaskan native

6□ Asian, Asian-American, or Pacific Islander

7□ Other (Specify.): _____

N5. In what country were you born? _____

N7. Are you:

1□ Employed full-time

2□ Employed part-time

3□ Not employed

4□ Retired/in school

5□ Other (Specify.): _____

N8. What is the highest grade in school that you finished?

1□ Did not finish high school

2□ Got a high school diploma or GED

3□ Had some college or vocational school

4□ Finished college or graduate school

N9. This is the last question. Which of the following most closely describes the yearly income level for your household? _____

0□ Under $5,000

1□ $5,000 – 9,999

2□ $10,000 – 14,999

3□ $15,000 – 24,999

4□ $25,000 – 34,999

5□ $35,000 – 49,999

6□ $50,000 – 64,999

7□ $65,000 – 79,999

8□ $80,000 or more

9□ Not sure/don't remember/refuse to answer

Thank you for taking the time to answer these questions. The answers will be very valuable in trying to improve health services in your community.

If you have any suggestions or questions about the study, following is the name and number of someone in the research office:

---

She (or he) would be pleased to speak with you at any time. Also, if you would like a copy of the study when it is finished, please tell me.

The person in charge of the study is _____
_____.

The number of the Office for Research Subjects is _____
_____.

## Appendix 3 Questionnaires of telephone interviewing

### Part I: Patient selection on primary care

| SN | Questions in Chinese | Translation in English |
|---|---|---|
| **P1.A1** | 年齡 | Age |
| **P1.A2** | 性別 | Sex |
| **P1.A3** | 居住地區 | Place |
| **P1.A4** | 教育程度 | Education |
| **P1.A5** | 年收入(新台幣) | Income |
| **P1.A6** | 工作狀態 | Job status |
| **P1.A7** | 個人患病狀態 | Illness status |
| **P1.A8** | 2011 年，整年之「就醫」次數 | |
| **P1.A9** | 2011 年，整年之「住院」次數 | |
| **P1.A10** | 2011 年，整年之「自付醫療費用」 | |
| **P1.B11** | 根據您近三年(2008-2011)的就醫經驗，「優先」選擇 | The first choice of the medical |
| **P1.B12.01** | 場所的清潔 | Cleanliness |
| **P1.B12.02** | 照護的品質 | Caring quality |
| **P1.B12.03** | 待診的時間 | Waiting time |
| **P1.B12.04** | 人員的親和度 | Friendliness |
| **P1.B12.05** | 機構的聲譽 | Reputation |
| **P1.B12.06** | 機構的層級 | Level of hospital |
| **P1.B12.07** | 醫療設備的完整 | Facility |
| **P1.B12.08** | 沒有 | None |
| **P1.B21** | 醫院類型 | Type of hospital |
| **P1.B22** | 醫師的專科類別(醫院) | Specialty of the hospital doctor |
| **P1.B23** | 醫師的服務態度(醫院) | Attitude of doctor(hospital) |
| **P1.B24** | 醫院的環境設施 | The environment and facilities of hospital |

| | | |
|---|---|---|
| **P1.B25.01** | 地點(距離) | Location (distance) |
| **P1.B25.02** | 停車場 | Parking lot |
| **P1.B25.03** | 等待時間 | Waiting time |
| **P1.B25.04** | 與醫師對話之時間 | Doctor and patient face-to-face talking time |
| **P1.B25.05** | 掛號方式 | Method of registration |
| **P1.B25.06** | 就醫金額 | Medical expenditure |
| **P1.B25.07** | 沒有 | None |
| **P1.B25.08** | 就醫選擇只選「醫院」， 請訪員記得勾選此項 | |
| **P1.B30.01** | 場所的清潔 | Cleanliness |
| **P1.B30.02** | 照護的品質 | Caring quality |
| **P1.B30.03** | 待診的時間 | Waiting time |
| **P1.B30.04** | 人員的親和度 | Friendliness |
| **P1.B30.05** | 機構的聲譽 | Reputation |
| **P1.B30.06** | 機構的層級 | Level of hospital |
| **P1.B30.07** | 醫療設備的完整 | Facility |
| **P1.B30.08** | 沒有 | None |
| **P1.B31** | 社區醫療(診所)之類型 | Type of Clinic |
| **P1.B32** | 醫師的專科類別(診所) | Specialty of the clinic doctor |
| **P1.B33** | 醫師的服務態度(診所) | Attitude of doctor (clinic) |
| **P1.B34** | 診所的環境設施 | The environment and facilities of clinic |
| **P1.B35.01** | 地點(距離) | Location (distance) |
| **P1.B35.02** | 停車場 | Parking lot |
| **P1.B35.03** | 等待時間 | Waiting time |
| **P1.B35.04** | 與醫師對話之時間 | Doctor and patient face to face talking time |
| **P1.B35.05** | 掛號方式 | Method of registration |
| **P1.B35.06** | 就醫金額 | Medical expenditure |
| **P1.B35.07** | 沒有 | None |

## Part II: PCAT

| SN | Questions in Chinese | Translation in English |
|---|---|---|
| **P2.A2** | 特定醫療院所(醫師)，對您的身體情況非常瞭解 | Is there a doctor or place that knows you best as a person? |
| **P2.A3** | 特定的醫院醫師或診所醫師，負責您的健康照顧 | Is there a doctor or place that is most responsible for your health care? |
| **P2.A8** | 在去年到您「常去看病的醫院或診所」就診幾次 | About how many times total have you been there? |
| **P2.A9** | 您在該醫院(診所)看病多久了 | How long have you been going there? |
| **P2.B1** | 需要作一般性的檢□，會先找您常去看病的那家醫院或診所的「醫師」替您檢□ | When you need a regular general checkup, do you go to your PCP before going somewhere else? |
| **P2.B2** | 當您「有新的健康問題想瞭解詢問時」，會先去找您常去看病的那家醫院或診所 | When you have a new health problem, do you go to your PCP before going somewhere else? |
| **P2.B3** | 當您需要其他專科醫師幫忙時，「常幫您看病的那位醫師」會幫您「轉診」嗎 | When you have to see a specialist, does your PCP have to approve or give you a referral? |
| **P2.C3** | 在醫院或診所上班期間，「醫師」當天就能為您看診 | When your PCP is open and you get sick, would someone from there see you on the same day? |
| **P2.C7** | 在醫院或診所下班期間，「醫師」當晚就能為您看診 | When your PCP is closed and you get sick during the night, would someone from there see you that night? |
| **P2.C4** | 在醫院或診所上班期間，可透過電話聯絡到「醫師」並得到諮詢醫療 | When your PCP is open, is there a phone number you can call when you get sick? |
| **P2.C5** | 在醫院或診所下班期間，可透過電話聯絡到「醫師」並得到諮詢醫療 | When your PCP is closed, is there a phone number you can call when you get sick? |
| **P2.D1** | 每一次都由固定的醫師為您看病服務 | When you go to your PCP, are you taken care of by the same doctor or nurse each time? |
| **P2.D4** | 當您有問題時，能打電話給「常去看病的醫師」並詢問您身體狀況 | If you have a question, can you call and talk to the doctor or nurse who knows you best? |
| **P2.D7** | 您「常去看病的醫師」，是否也瞭解您個人其他情形 | Does your PCP know you very well as a person, rather than as someone with a medical problem? |
| **P2.D9** | 您「常去看病的醫師」，能否清楚明白哪些問題對您最重要(健康與其他情形) | Does your PCP know what problems are most important to |

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|---|---|---|
| | | you? |
| **P2.E2** | 就診過任何其他專科醫師 | Have you ever had a visit to any kind of specialist or special service? |
| **P2.E8** | 您的「醫師」會與您討論或建議到其他的醫療院所，以解決醫療上的問題 | Did your PCP discuss with you different places you could have gone to get help with that problem? |
| **P2.E9** | 會幫您預約掛號到其他專科醫師 | Did your PCP or someone working with your PCP help you make the appointment for that visit? |
| **P2.E12** | 看過其他專科醫師後，原醫師會與您討論看診後之情形 | After you went to the specialist or special service, did your PCP talk with you about what happened at the visit? |
| **P2.F1** | 看病時，會帶自己過去的任何病歷資料 | When you go to your PCP, do you bring any of your own medical records, such as shot records or reports of medical care you had in the past? |
| **P2.F2** | 您可以看到自己的病歷資料 | Could you look at your medical record if you wanted to? |
| **P2.F3** | 您在醫院或診所，您的病歷資料可隨時調□ | When you go to your PCP, is your medical record always available? |
| **P2.G2** | 預防注射 | Immunizations (shots) |
| **P2.G6** | 家庭計畫，生育控制 | Family planning or birth control methods |
| **P2.G8** | 心理健康問題諮詢 | Counseling for mental health problems |
| **P2.G10** | 傷口縫合 | Sewing up a cut that needs stitches |
| **P2.H1** | 健康食品、有關於睡眠方面的問題 | Advice about healthy and unhealthy foods or getting enough sleep |
| **P2.H2** | 居家安全問題 | Home safety, like getting and checking smoke detectors and storing medicines safely |
| **P2.H4** | 如何處理經常發生的家庭衝突 | Ways to handle family conflicts that may arise from time to time |
| **P2.H5** | 您個人如何適當運動問題 | Advice about appropriate exercise for you |
| **P2.H7** | 目前所服用藥物方面的問題 | Checking on and discussing the medications you are taking |
| **P2.I1** | 常為您看病的醫師 | Does your PCP ask you about |

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| | | your ideas and opinions when planning treatment and care for you or a family member? |
| **P2.I2** | 會問您有關於您家人中的疾病和相關問題 | Has your PCP asked about illness or problems that might run in your family? |
| **P2.I3** | 會與您其他的家庭成員會面 | Would your PCP meet with members of your family if you thought it would be helpful? |
| **P2.J1** | 做過居家訪問 | Does anyone at your PCP's office ever make home visits? |
| **P2.J2** | 是否清楚您社區的健康問題 | Does your PCP know about the important health problems of your neighborhood? |
| **P2.J3** | 提供更好的醫療照顧會聽取別人的意見 | Does your PCP get opinions and ideas from people that will help to provide better health care? |
| **P2.K1** | 您會推薦「常為您看病的醫師」給親戚或朋友 | Would you recommend your PCP to a friend or relative? |
| **P2.K3** | 您會介紹「常為您看病的醫師」給那些使用民俗法治療疾病的人 | Would you recommend your PCP to someone who uses folk medicine, such as herbs or homemade medicines, or has special beliefs about health care? |
| **P2.L2** | 在 2011 年，您的保險支付方式 | During the last 12 months, was any of your health care paid through: |
| **P2.M1** | 認為個人的健康狀況 | Would you say your health is |
| **P2.M2** | 持續一年以上的身體上、心理上或情緒上問題 | Do you have any physical, mental, or emotional problem that has lasted or is likely to last longer than one year? |

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## Part III: Conditional manipulation on copayment and physician flow

| SN | Questions in Chinese | Translation in English |
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| **P3.A1** | 如果提高醫院的門診健保自付額，您會選擇何者作為您的醫療照護場所 | If the copayment increases, what will your selection of medical service be? |
| **P3.A2** | 如果降低醫院的門診健保自付額，您會選擇何者作為您的醫療照護場所 | If the copayment decreases, what will your selection of medical service be? |
| **P3.A3** | 如果「常為您看病的醫師」從醫院轉到社區醫療去看病，您願意跟隨他到社區醫療看診 | If your physician switches from the hospital to the CHC, would you follow him to the CHC? |
| **P3.A4** | 如果「常為您看病的醫師」從社區醫療轉到醫院去看病，您願意跟隨他到醫院醫療看診 | If your physician switches from the CHC to the hospital, would you follow him to the hospital? |

# Curriculum Vitae

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